NATIONAL CAR BUILDER

VOLUME XI. NUMBER I.

DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

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JANUARY, 1880.

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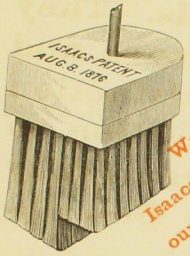

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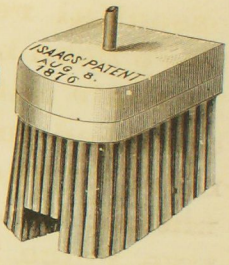

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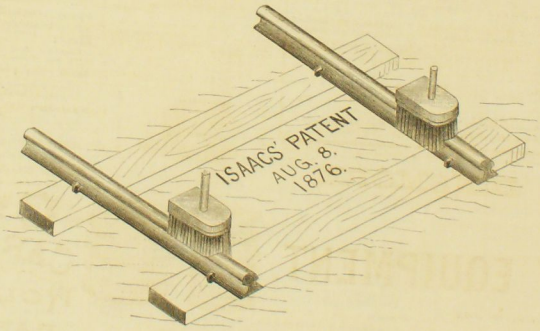

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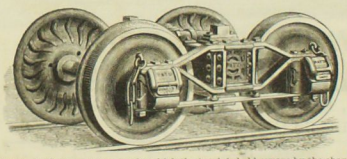

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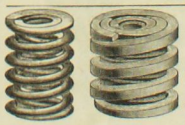

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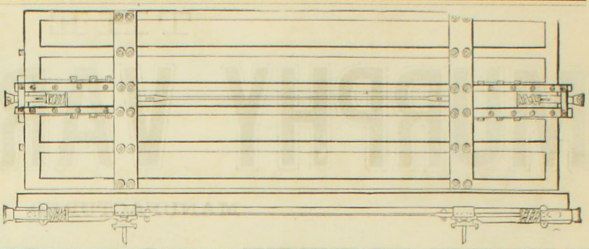

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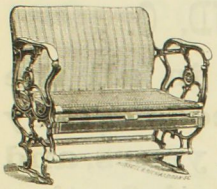

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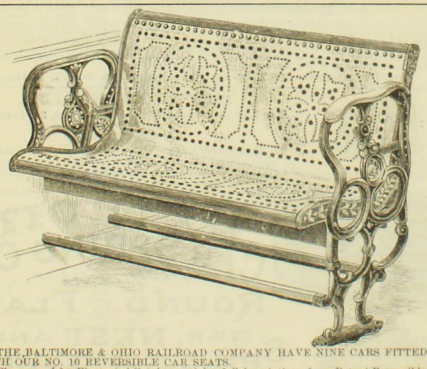

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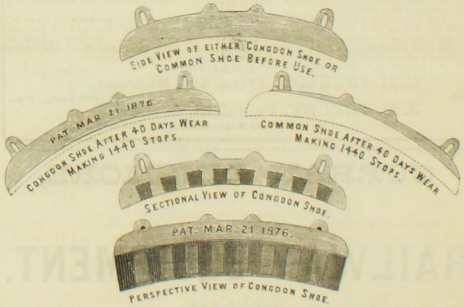

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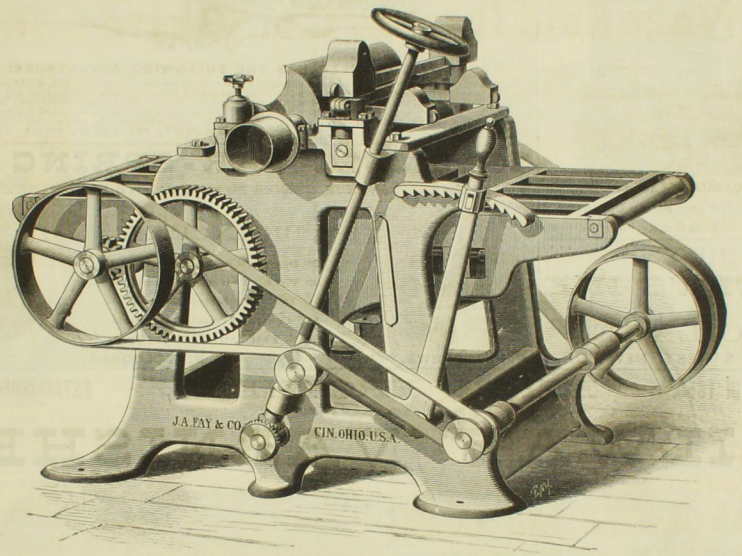

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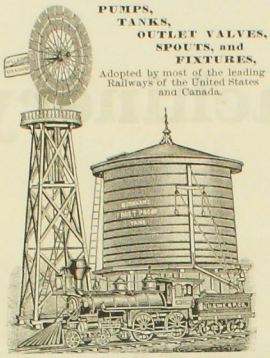

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Weight Complete, with Steel Pin.

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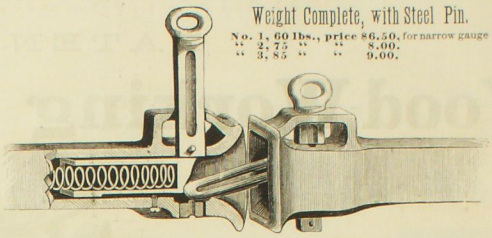

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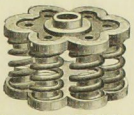

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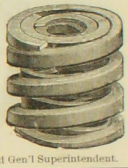

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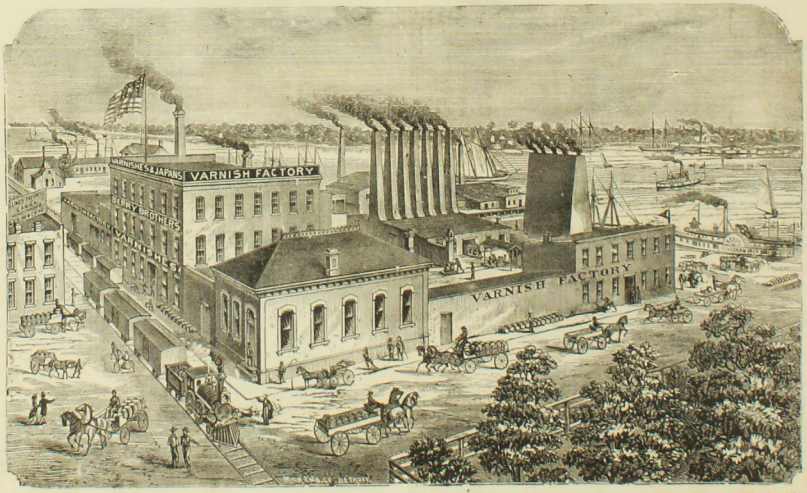

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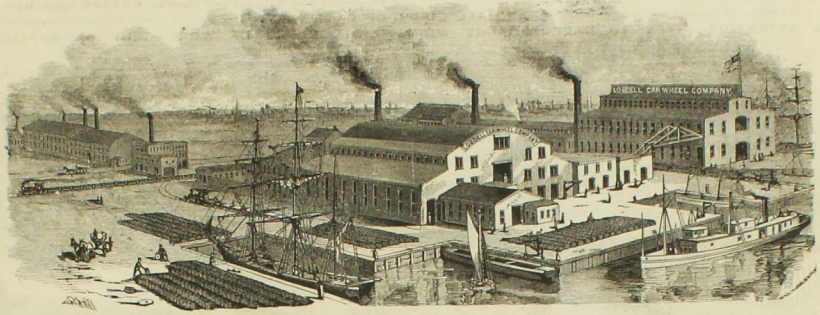

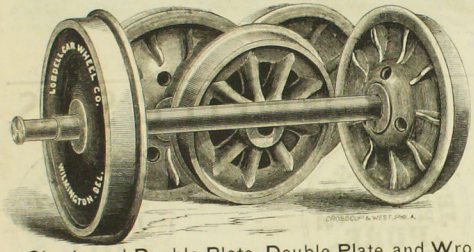

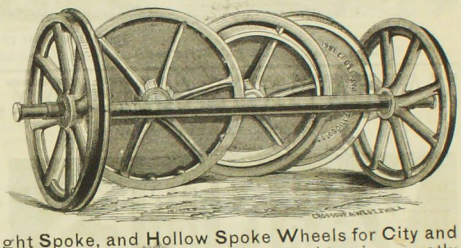

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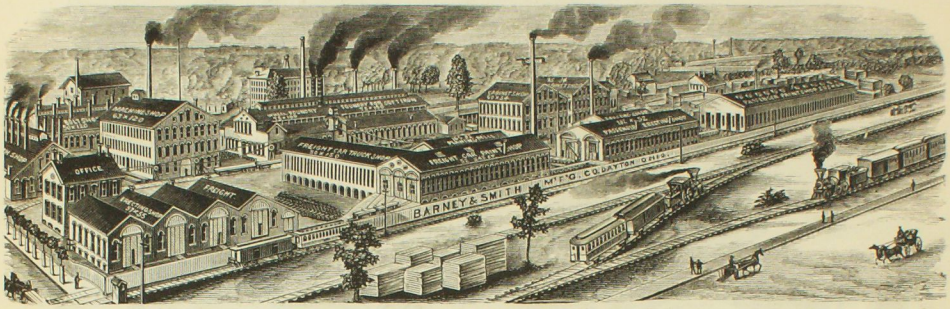

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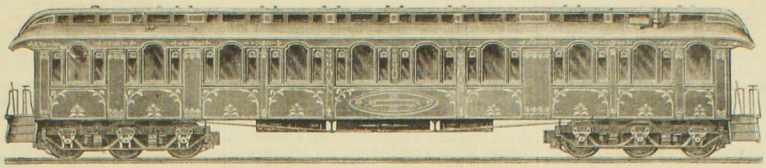


DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

VOLUME XI. NUMBER I. JANUARY, 1880. SINGLE NUMBERS, TEN CENTS. $1.00 PER ANNUM.

Reward of Honest Industry.

BY ALFRED L. SEWELL.

I want to tell the boys about a friend of mine whose faithful performance of present duty led him into higher positions than he ever dreamed of filling, and gave him what we would all like to reach—honor and success.

In the years of my experience as a printer in Chicago, more than twenty years ago, our firm did a good deal of printing for the Chicago, Burlington & Quincy Railroad, and because of this I came to know a young man who is the subject of my story.

He came from Massachusetts; he was poor, and had no influential friends to even give him a letter of recommendation. He sought employment on the Chicago, Burlington & Quincy Railroad, and after waiting a time at last secured a position as a brakeman on a freight train—salary only $30 a month. He was faithful in this position, and being both intellectual and industrious, he was soon made a conductor on the train, with wages nearly doubled. He soon attracted the attention of his superior officers, who saw in him an honest, faithful, conscientious conductor, one not seeking his own ease or pleasure, but constantly devoted to the interests of the company that employed him, so that not many months elapsed before he was made conductor of a passenger train—a more comfortable position, and one yielding a higher salary. Here I first knew him, a modest, quiet, unassuming young man, free from the popular vices, and one who tried to be just as faithful and true and devoted to his work as a conductor as though the position had been that of General Superintendent.

He did not apparently have a high opinion of his own abilities; there was a total absence of that swagger and strut so often seen in those who come to similar subaltern positions. It seemed as though to properly conduct his train—to secure the comfort of his passengers and rightly serve the interests of his company—required the full exercise of all the powers God had given him.

One of the sternest and most exacting, and yet one of the noblest, ablest, and most conscientious who ever filled a similar position, was then General Superintendent of the road. This man—Col. G. C. Hammond—watched every employé of the road with an eagle eye. He measured every man, knew the ability of each, and seemed intuitively to know the faithful workers from the shirks. Our young conductor did not escape his keen eye. When he least thought of it, his chief was measuring and sounding him, and finding out what kind of metal he was of. But no one ever knew whether he was approved or not, for the chief's look was always stern and cold as ice.

One Friday night, train number four moved slowly out of Chicago under the care of my young friend, who, only intent upon doing his work as well as he knew how, seemed to have no higher ambition than to be a good conductor—salary nine hundred dollars a year. About noon, when he stopped at the station, he found a telegram from the head office, ordering him to leave the train in care of ——, and take the first train for Chicago.

This was an unusual thing. Wondering what was the matter; conscious that he had tried to do exactly right, and yet remembering how exacting was the General Superintendent, he feared that, unintentionally, he had fallen under his displeasure. Reaching Chicago late Saturday evening, he found Colonel Hammond had gone home, and, knowing how strict he was in his observance of the Sabbath, the conductor waited impatiently for the coming Monday morning, when, with a fearful heart, he presented himself at the office of the Superintendent.

"Good morning, Mr. Hammond; I've answered your telegram, and come to see what it means."

"Good morning," growled the chief: "I see you have, sir. I have concluded to take your train away from you."

The conductor's heart sank lower than ever. What before was only fearful foreboding was now painful truth. He had served the company to the best of his ability: he had kept the affairs of his train in complete order: his reports had been carefully and correctly made; and yet, after all, he had lost his position, he knew not why, and felt that his case was sad indeed. He inwardly resolved that, having missed his calling he would quit railroading and try some other service, where faithful work would be appreciated. He dared not hope to reverse the decision of the official, yet, in as calm a voice as he could command, he politely asked the reason of his summary dismissal.

Colonel Hammond waited a while before he answered. Then the muscles of his face relaxed a little, and he said:

"I want an assistant superintendent in my office, and I have called you to take the place."

True worth is always modest, and our thunderstruck conductor could only stammer:

"But I am not competent, sir, to fill the position you offer."

"You can do as I tell you; you can obey orders, and carry out the details of the work laid out by the chief."

To these duties he brought the same thoroughness and faithfulness that had made him noticeable as a conductor. His elevation did not make him vain or spoil him. He was as plain and modest and hard-working as before; the salary at first was $1,800.

After a few years of service under Col. Hammond, and an advance of salary to $2,500, the plain young man was invited to take the office of general superintendent of the young road, at a salary of $4,000. Distrusting his own ability, but determined to do his best, he accepted the call, and succeeded, until the Chicago, Burlington & Quincy Railroad, realizing how much they had lost in parting with him, invited him to resume his old position, with the tempting offer of $6,000 a year.

In the mean time, Col. Hammond had become Superintendent of the Union Pacific road, running from Omaha to Ogden, where it connects with the Central Pacific road. The latter road was owned by four or five millionaires who had built it, one of whom was its general superintendent. However good a business man, he knew but little about railroading, and under his care the road was anything but prosperous, until the owners and directors resolved upon a radical and sweeping change.

But where could they find a general superintendent who had the ability and would dare to reorganize the road and put its affairs upon a better basis? They consulted Col. Hammond and other railroad men, and the result was that, most unexpectedly, our modest and hard-working conductor one day received a telegram, asking him if he would undertake the duties of General Superintendent of the Central Pacific road at a salary of $10,000. He was satisfied with his appreciation by the Chicago, Burlington & Quincy Railroad, who proposed to increase his pay to $7,000, and as he preferred to remain in Chicago, he declined the princely offer made by the California road. Then another telegram asked at what salary he would become the chief of the Central Pacific. Almost hoping to discourage his tempters, he telegraphed, "$13,000 a year in gold."

At once came the answer, "Accepted."

So, taken in his own trap, he had nothing to do but to bid adieu to the city that had served him so well, and turn his face toward the land of gold. My story would be too long if I should try to tell you the unexpected difficulties he encountered from the old officers of the road, who had determined that they would not be superseded, and that the new superintendent should never enter upon his duties; how they, before his arrival, set the whole press and people of California against him; how, supported by the directors of the road, he quietly took control, disarmed prejudice, conquered submission and was successful.

This was nine years ago. He is still General Superintendent of the Central Pacific, one of the most important railroads in the world. With its connections with California, this quiet man now superintends 2,734 miles of railroad and over fifty connecting steamboats, besides dictating the tariffs of the China, the Australian, and the Panama lines of steamships. While other young men preferred present ease and comfort to the interest of their employers, wasted time in billiard halls and theatres and drinking saloons, Albion N. Towne was at work, building up character as well as reputation, and now fills one of the most important positions in California, and instead of $360 a year as brakeman on a freight train, he now draws the comfortable salary of $20,000 a year in gold.

"Lucky man," said one.

"Lucky" had but very little to do with it; modest worth did it; work did it; faithfulness in the performance of present duties, however humble, did the most.

His untiring faithfulness in the humbler duties not only attracted the notice and won the appre-

ciation of his superiors, but fitted him for the higher positions which, without his seeking, he was called upon to fill.

I have only desired to tell this story of a young man's faithfulness and consequent success, for I consider it a lesson that boys and young men of the day can study to advantage.

Presence of Mind.

Many railroad accidents are prevented by a presence of mind on the part of engineers. A passenger train on the C. B. & Q. road was rounding a sharp curve, just under a piece of tall timber. The watchful engineer saw a tree lying across the track 60 feet ahead of the locomotive. The train was running at a rate of 35 miles an hour, and to check its momentum before reaching the obstruction was out of the question. The engineer took in the situation at a glance. He threw the throttle wide open, the engine shot ahead with the velocity of an arrow, and with such tremendous force that the tree was picked up by the cow-catcher and flung from the track as if it had been a willow withe. A man with not so cool a head would have made the best possible use of those 60 feet in the way of checking the speed of the train. That would have caused a disaster. Bradford, an engineer, was bringing an express train over the Kankakee line from Indianapolis. As the engine shot out from the deep cut and struck a short piece of straight track leading to a bridge, a herd of colts were discovered running down the road. The distance to the river was only 100 feet. Bradford knew he could not stop the train, and also knew that if the colts beat the locomotive to the bridge they would fall between the timbers, and the obstruction would throw the train off, and probably result in a frightful loss of life. It took him only half a second to think of all this. The other half was utilized in giving his engine such a quantity of steam that it covered that 100 feet of track in about the same time that a bolt of lightning would travel from the tip of a lightning rod to the ground. The colts were struck and hurled down the embankment just as they were entering the bridge.

Grinding Chilled Car Wheels.

The Chilled Car Wheel Grinding Co. has been organized at Carson, Nevada, for introducing the Gowan machine for grinding the chilled treads of wheels that have become badly worn, so as to make them perfectly true, and capable of doubling their original mileage. A circular issued by the company states that 16 pairs of 33-inch wheels, trued by this process, were put into service Oct. 1, 1877, on the Virginia & Truckee Railroad, and up to Nov. 13, 1879, had made 81,848 miles, with 24,728 stops, controlled by the Westinghouse air-brake. The diameter was found to have been reduced $\frac{3}{16}$ of an inch, and the wheels supposed to be capable of making as much additional mileage before a second grinding becomes necessary, which will leave $\frac{3}{16}$ inch depth of chill, and a third $\frac{1}{16}$ inch, making due allowance for inequalities in depth. The machine, it is said, will true one pair of wheels per hour, the average cost of emery for a new wheel being 8 cents, and for an old wheel, 16 cents. Any person familiar with the use of tools can operate the machine after a few hours' instruction. If this method is in all respects what is claimed for it, an enormous waste of wheels will be prevented, and a corresponding saving made in railroad expenditure for equipment.

AN order has been placed by the St. Louis, Iron Mountain and Southern road with the Rogers Locomotive Works for five large freight engines of ten-wheel pattern; cylinders, 18 × 24. They are to have no pumps, the feed-water equipment being two "Mack" injectors.

Pullman Sleepers on Rock Island.

Negotiations are said to be in progress, if not already completed, for transferring the management of the Chicago, Rock Island & Pacific sleeping cars to Mr. Pullman. This road has heretofore run its own sleepers and they were well managed, yet notwithstanding, they lacked the popularity of the Pullman cars. Should the arrangement be completed, the Pullman management will extend from Chicago to San Francisco over the Western connections of the Rock Island. There are also rumors of negotiations with Mr. Vanderbilt, looking toward a substitution of Pullman for Wagner coaches on the New York Central. There is no denying the enterprise and superior facilities of the Pullman Company in supplying the great lines with the most luxurious car accommodations. The movements that have been made within the past few years by sundry roads to run sleeping cars of their own, do not seem to be remarkably successful. Although they have been constructed in some cases at a much less cost, and on the interchangeable principle, so as to combine parlor and sleeping coach in one, yet they have not won a wide popularity with the traveling public. The Michigan Central and Great Western some years ago substituted Wagner cars for Pullman, but for some reason they do not give equal satisfaction. The Illinois Central, which ran its own sleepers for several years, has now contracted with Mr. Pullman to run his cars alternately with its own between Chicago and New Orleans, while on the Illinois Central and St. Louis line his sleepers are now exclusively used.

A Superb Narrow-Gauge Passenger Car.

The Ohio Falls Car Company, at Jeffersonville, Ind., has recently completed a very handsome narrow-gauge passenger car for the Des Moines, Adel & Western road. In its design and workmanship throughout it presents many new and novel features, and so far surpasses any of the fine cars of this class heretofore constructed at these works, that it is deserving of special notice. The body is 40 ft. long and 8 ft. 2 in. wide, with 14 double windows on each side, 32 in. from centre to centre. There are 24 reversible seats of sufficient length for two persons each. They are upholstered in garnet and green plush, and in their design are of a style quite different from anything produced heretofore. The interior finish is a combination of the Eastlake and Queen Anne styles, exhibited in a profusion of rich veneers, carving and inlaid work, penciled in gold leaf and ebony. The pilasters and capitals are Grecian, but combine harmoniously with their surroundings. The trimmings throughout are Queen Anne in bronze. The head-lining was designed at the works, and is a splendid piece of art. The deck-lights are white-figured ground glass. The lighting is by lamps of a new style, gotten up specially for this car. Spear stoves are used, with shields to protect the woodwork—a new ventilating device which warms the cold air admitted at the roof and discharges it through perforations near the floor. There are also end transoms and pivoted sashes. Miller platforms, couplers and buffers are used. There is a little too much camber between bolsters for strictly so-called modern work, a half-inch being all that is permissible, while between bolsters and ends, the car-body should be perfectly horizontal. On the outside there are alternate wide and narrow panels below the belt-rail, beautifully painted in mosaic. The name of the car is in shaded gold letters. The car was built under the joint supervision of Mr. Robert Ramsey, late of Penn. R. R., and foreman of erecting shop, and Mr. John Gunkel, foreman of passenger car department. The artistic designing of the inside work is credited to Mr. W. Hayden, who is a new comer and bids fair to achieve a wide reputation for skill and taste in car decoration.

The company has also just completed for the Burlington & Missouri road, in Nebraska, four Eastlake cars. They now have under contract three sleeping cars for Southern railroads. When completed, they will be rich in finish and elegant in design. Upwards of 1,200 men are now employed at the works.

Standard Gauge at the South.

With the exception of the so-called narrow-gauge roads, the standard of 4.8½ has become almost universal at the north and west, the Atlantic & Great Western being all that remains of the antiquated wide track. The Southern roads, however, are mostly 5-feet gauge, the inconvenience of which in travel and general traffic becomes more manifest every year. The territory south of the Ohio and Potomac rivers is to this extent isolated, and must remain so until the gauges are made to conform to the prevailing standard. Only about 8,400 miles of 5-feet gauge remain, together with one or two roads of 6-feet, and a few miles of 5½-feet. Little by little the southern roads will have to be reconstructed in conformity with those of the north, and the sooner the change is made the better will it be for the business prosperity of that section. The standard gauge has already made good headway in Virginia and the southwest, and now it is announced that the Owensboro & Nashville road is to have its track narrowed to the standard width. The change will be attended with some expense and trouble, but the advantages that are sure to result from the general movement in this direction will compensate for it a hundred-fold. The gauge battle will then be fought out between the advocates of the standard and 3-feet, and it is not unlikely that the argument will ultimately be silenced by the overpowering necessity of uniformity, aside from the abstract merits of either.

Rates for Locomotives.

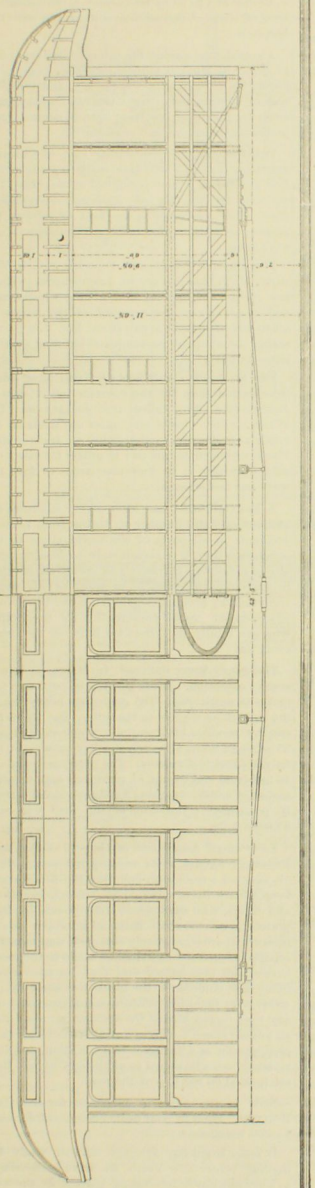
By announcement of Commissioner Fink, the eastern trunk lines have agreed upon the following rates, on the basis of New York to Chicago; to be charged on locomotives, on the basis of New York to Chicago: Locomotives and tenders on their own wheels, 30 cents per 100 lbs.; man in charge free; no return pass. Locomotives and tenders on trucks (the latter to be furnished by the shipper), 40 cents per 100 lbs., man in charge free; no return pass. Trucks to be returned free. These rates went into effect Dec. 8.

MR. J. W. Midgley, Commissioner of the Southwestern Railway Association, gives notice that hereafter the following rates to St. Joseph, Atchison, Leavenworth, or Kansas City will be charged on shipments of locomotives from Eastern points: On locomotives and tenders on their own wheels, man in charge free. From Toledo, 26½ cents per 100 pounds; from Chicago, 20 cents; from East St. Louis, 14½ cents; from East Hannibal or Dey street, 13½ cents. Locomotives and tenders on their own trucks (the latter furnished by shipper), man in charge free. From Toledo, 39 cents per 100 pounds; from Chicago, 30 cents; from East St. Louis, 22½ cents; and from Hannibal or Quincy, 21 cents.

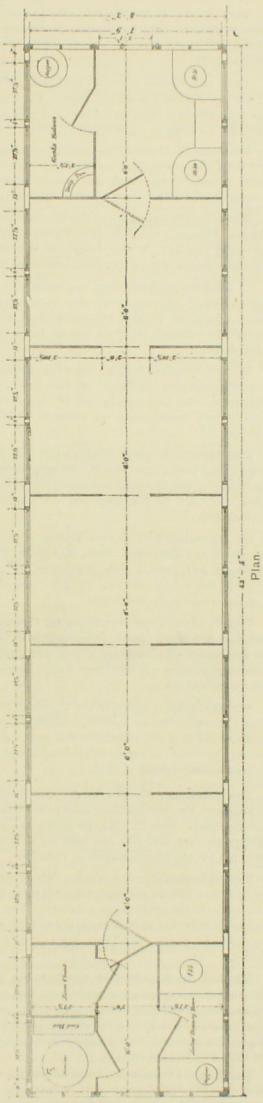
THE master car-builder of a leading western road makes the following report, showing the comparative service of brake-shoes during the years 1877 and 1878:

	No. Shoes.	Weight, lbs.	Cost.
1877—Common cast iron	17,717	463,010	$8,344.98
1878—Congdon	9,000	259,500	4,071.00
Decrease	8,117	204,110	$3,073.98
Labor saved in changing 8117 shoes, 3 cts. each			243.51
Net amount saved			$3,017.49

NARROW-GAUGE SLEEPING CAR, BUILT AT PULLMAN CAR WORKS, DETROIT, MICH., FOR DENVER, SOUTH PARK & PACIFIC RAILROAD.



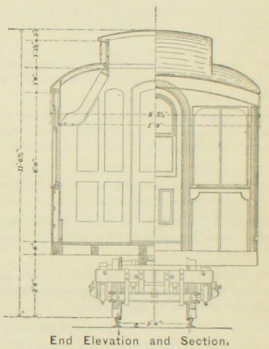
Side Elevation and Section.



Plan.

THE drawings illustrate the construction of some very fine sleeping cars, recently built at the Detroit shops of the Pullman Palace Car Company, for the Denver, South Park & Pacific Railroad—3-feet gauge. The dimensions are as follows: Length of body, 42 ft. 5 in.; width, 8 ft. 2 in.; height, 9 ft. 6 in; height from rail to top of car, 11 ft. 6½ in. There are 20 berths, 6 ft. long by 2 ft. 10 in. wide. The trucks are the Pullman 4-wheel standard, with 30-inch paper wheels (Allen's patent) 3¼ by 6 inch journals, and Bissell's oil-box and stop-wedge. The cars are equipped with Eames' vacuum brakes applied to each truck, and weigh 15 tons each.

The interior decoration and finish are original in design, and exhibit some of the most beautiful specimens of cabinet work to be found in railway passenger cars. No mere description can convey an idea of the artistic skill displayed in the workmanship and the minute elaboration with which the details are worked out. The woods used are mahongay, French walnut, white oak, rosewood, white holly and primavera, some of which take a beautiful and permanent polish that will stand wearing and washing. There is an entire absence of gilding, which enhances the effect of the exquisite inlay work in leaves and flowers, outlined after



End Elevation and Section.

the Queen Anne style. The ceiling is in figured white oak, beautifully paneled and decorated with vines and flower pieces, this being one of the noted improvements in head-linings introduced by the Pullman Company. Glass of windows, 22 by 24, and 9 by 24; dome lights, 5 by 24.

At one end of the car are the ladies' toilet, a large linen closet, and Baker heater; and at the other end, the gentlemen's lavatory and saloon. The toilet conveniences are great improvements upon former plans, and the heater has an automatic attachment which prevents any liability to explode. Narrow mirrors occupy the spaces between the windows, the sections are richly upholstered in Buceau plush, and the carpets and curtains harmonize with their surroundings. The upper berths have steel safety-cords, and a newly invented clothes-rack. Each car is lighted with five Hicks & Smith's two-light hurricane lamps, suspended from the ceiling.

The outside is painted in the usual chocolate color, relieved with gilt designs of the Queen Anne style. The windows are polished French plate glass. Every thing pertaining to the cars, even the silvering of the mirrors and the etching of the ornamental glass, is the product of the Pullman shops. They were built under the supervision of the manager, Mr. J. A. Bissell, and are, without any question, the most beautiful and perfect specimens of passenger car rolling stock in the world. Four of them have already been built and forwarded to their destination.

Miscellaneous Items.

IT is said that the car works in this country have built in the last eleven months 37,350 cars.

THE Harrisburg (Pa.) Car Works are turning out 12 eight-wheeled box cars per day.

THE Litchfield (Ill.) Car Works have orders from numerous roads, and are full of work.

THE car shops at Middletown, Dauphin County, Pa., are soon to resume work, and will employ 300 men.

THE Laconia (N. H.) Car Company has a contract to build 100 box cars for the Fitchburg Railroad.

THE Lehigh Car & Manufacturing Co., at Stemton, Pa., has received an additional order for 500 box cars.

THE Union Pacific is building at its Omaha shops 350 freight cars, and has also ordered 30 new locomotives.

THE Terre Haute (Ind.) Car Works are building 400 freight cars for the Columbus & Sunday Creek Valley road.

WORK will begin immediately at the Pennsylvania Railroad shops, at Altoona, on a contract for 1000 box cars.

THE railroads in Iowa employ 15,391 persons, and use 31,584 cars of all kinds, of which 578 are passenger cars.

THE Chicago Axle & Forge Works have just finished 1,000 axles, the last of 12,000, for a leading trunk line in the West.

TRACK-LAYING on the Northern Pacific has ceased for the winter, only 52 miles having been laid during the season just closed.

MESSRS. A. WHITNEY & SONS (Phila.) have recently made shipments of car wheels to South America and England.

THE Pullman Car Shops in Detroit have just completed ten very handsome cars for the Metropolitan Elevated road in New York.

THE last rail on the Cincinnati Southern has just been laid, which completes the line from Cincinnati to Chattanooga—a distance of 336 miles.

THE St. Charles (Mo.) Manufacturing Co. is building 50 box cars for the St. Louis, Keokuk & Northwestern road.

The Rhode Island Locomotive Works, at Providence, are to build 25 engines for the Manhattan Elevated Company.

THE Beaver Falls Car Works are filling an order of 100 coke cars for the Lake Erie railroad, at the rate of twenty per week.

THE Peninsular Car Co. is a new organization formed to lease the Detroit Car Works and the Ford Forge in Hamtramck, a suburb of Detroit.

THE Brooks Locomotive Works, at Dunkirk, N. Y., are to build eight heavy freight engines, with 18×24 in. cylinders, for the Indiana, Bloomington & Western road.

THE freight business on the Buffalo, New York & Philadelphia road is so much on the increase that a large number of new box cars are to be made forthwith.

THE Boston & Albany Railroad is now completely equipped at all switches and stations from Boston to Worcester, with Hall's automatic electric signals.

THE Pennsylvania Railroad, it is stated, will erect a new car wheel foundry at Altoona, which will have a capacity of turning out 125 wheels per diem.

FIFTEEN acres of land at Brightwood, a suburb of Indianapolis, have been given as a site for car works, and a company is to be organized to build them.

THE Denver & Rio Grande road has contracted for 40 freight and 12 passenger locomotives; also for 1,500 freight cars, 400 of which are to be built at York, Pa.

THEY now run an "extra rapid train" between Paris and Marseilles, which makes the trip in 38 hours—which is 38 miles an hour. In France they call such a train a "lightning express."

MR. JOHN W. GARRETT has been chosen President of the Baltimore & Ohio Railroad Co. for the ensuing year, which makes the twenty-second consecutive year of his service in that capacity.

WORK on the extension to the Westinghouse Air Brake Company's building in Pittsburgh, is progressing rapidly. When completed, the capacity of these works will be increased about one-third.

IN a Boston railroad office the sign "no passes given here" appears over the superintendent's desk, and if one applies at another desk they are referred to the official over whose head the sign dangles.

DURING October, 84,685 cars were moved over the Philadelphia Division of the Pennsylvania Railroad. Taking twenty-seven days for the month, this would make an average of 3136 cars per day.

THE Atlantic & Great Western Railway is to be sold under foreclosure Jan. 6. It is said that the liabilities of the company are about $70,000,000 and that the sale is not expected to realize over $10,000,000.

ON December 3d the men employed in the car shops of the Delaware, Lackawanna & Western Railroad, in Scranton, were notified of an advance of from five to ten per cent. in their wages, without any request on their part.

THE St. Charles Car Works, at St. Charles, Mo., employ 300 men. Improvements are in progress in machinery and buildings which will enable the company to turn out eight cars a day, and employ an additional force.

SUPERINTENDENT HAYS, of the Woodruff Sleeping Car Company, states that the earnings of their coaches the first ten months of this year were fully twenty per cent. in excess of their earnings for the corresponding period of 1878.

THE Pittsburg, Ft. Wayne & Chicago shops in Allegheny, Pa., are building four new locomotives for the road. The Ft. Wayne shops are to build 500 grain cars and 300 gondolas for the road and 200 cars for the Grand Rapids & Indiana.

THE Schenectady Locomotive Works are running 18 to 20 hours per day, with 675 men, turning out 12 or 13 locomotives per month. The largest number built by this company in 1872 was 11 locomotives per month. Their shops present a busy scene.

MR. JOS. NIMMO, Chief of the National Bureau of Statistics, says, in his report on the internal commerce of the United States, that the average cost of transportation on ten of the principal railroads, has declined from 2.3 cents per ton per mile in 1868, to 0.95 cent in 1878.

THE railroad velocipede is said to work perfectly and with very little exertion. It has four wheels of the bicycle pattern, with flanged rims to fit the rails of the track. The velocipede weighs less than 150 pounds, and one man can easily set it on or off the track.

THE establishment of a railway ambulance corps is proposed in Massachusetts. The idea is to furnish speedy and trustworthy relief to sufferers in cases of railway accidents; the corps to be located in Boston and to be in telephonic communication with all parts of the railway system, and with the hospitals.

AN exchange quotes the prices of railway cars, as given by Mr. Uri Gilbert, of Troy, before the legislative investigating committee, and adds, by way of continuation, that "tin cars, used exclusively by juveniles, cost from 25 to 75 cents a train, including the engine and engineer!"

THE Railway Age Publishing Co., of Chicago, announce that they will issue early in January the first number of a new periodical to be called *The Railway Age Monthly and Railway Service Magazine*. This new-comer in the field of railway literature we shall notice more particularly in our next issue.

THE Cayuta Wheel and Foundry Co., in Waverly, N. Y., has just put in a new cupola with a new Sturtevant blower, and a new wheel-borer, and thus increased the capacity of the works to about 200 car-wheels a day from Jan. 1. In the spring the company contemplates building another large foundry.

THE St. Louis Car-Wheel Company have established a new shop for the construction of cars at Jacksonville, Ill., called the Jacksonville Car Works. The wheels and axles are made in St. Louis and shipped to the shops at Jacksonville. There seems to be no end to orders for cars; the only difficulty is to find mechanics to turn the work out fast enough.

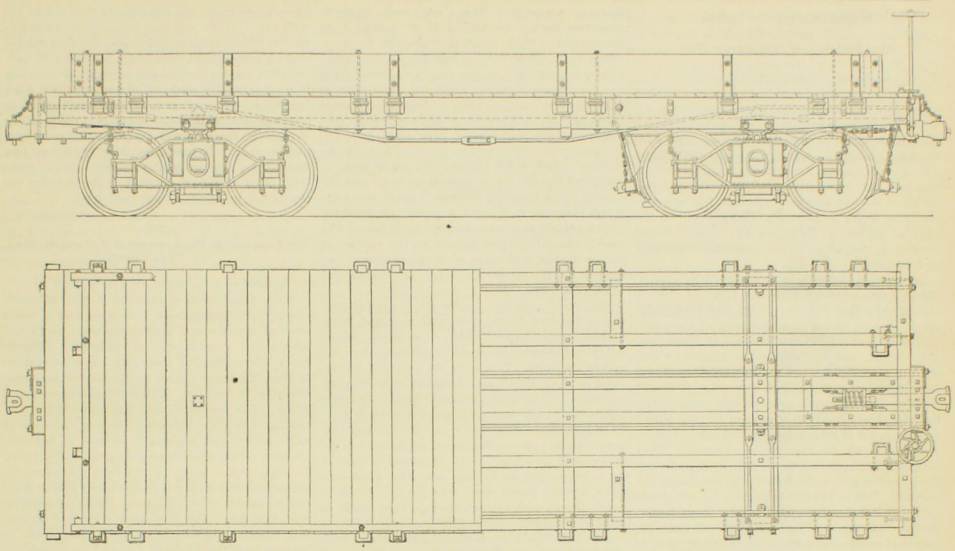
A FRENCH statist has, after a very laborious examination of the number of deaths from railway accidents in all parts of the world, come to the conclusion that, if a person were to live continually in a railway carriage, and spend all his time in traveling, the chances in favor of his dying from railway accident would not occur till he was 960 years old. Small comfort this for the victims who are fatally or otherwise hurt on the roads every day.

THE Sandy River Railroad, in Maine, is in successful operation. It has a gauge of only two feet and is 18 miles long. The grades are heavy, reaching as high as 105 feet to the mile. The trains are run by peculiar little engines, which easily make 25 miles an hour, although the driving-wheels are only 21½ feet in diameter. The passenger cars are 40 feet from end to end of platforms and 6 feet 2 inches in width, weighing 9,000 pounds and seating 30 passengers. The cost of the road was only $5,000 a mile.

THE Central Association of General Ticket and Passenger Agents, at its meeting in Chicago, Dec. 17, adopted a resolution directing the Secretary to keep a black list of newspapers, editors, publishers and others, who shall obtain free passes by false pretenses, or who shall make an improper use of passes that are legitimately obtained; that monthly reports of such persons shall be made to the members of the association, and that no one whose name is so entered on the black list, shall be entitled to or furnished with free transportation on any road represented in the association; also, that all annual passes to newspaper men shall bear their photographs as a means of identification, and that no such passes be issued to publishers unless they are located on the line of the road.

NOW is the time to subscribe for the CAR-BUILDER. Send in your orders before our January issue is exhausted.

IN order to get our January number ready for mailing before New Year's, we have been obliged to leave out much interesting matter in the way of cuts, correspondence, etc. Our next issue will be an improvement on the present one.



STANDARD PLATFORM AND COAL CAR, MISSOURI, KANSAS AND TEXAS RAILWAY.

THE drawings represent a side and end elevation and plan of Standard Platform and Coal Car of the Missouri, Kansas & Texas Railway. The principal specifications are as follows :

Length over all, 28 ft. 1¼ in.; wi 1th over outside sills, 8 ft. 4 in.; width of deck, 8 ft. 6 in.; centre of draw-head above rail, 2 ft. 9 in.

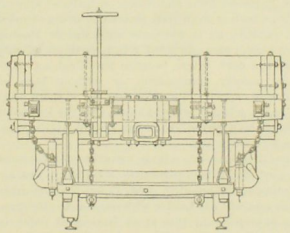
Outside sills, 4½ × 12½ in. × 28 ft. 1¼ in.; wheel sills, 4½ × 8 in. × 27 ft. 4¾ in., best hard or Norway pine; centre sills, 4½ × 8½ in. × 27 ft. 4¾ in.; end sills, 5 × 8 in. at ends, and 5 × 9 in. at centre; 8 ft. 10 in. over all; transoms, 5 × 13 in. × 8 ft., all best white oak; Buffer-blocks, 5½ × 9 × 26 in.; brake beams, 3¾ × 7, at centre, 3¾ × 4 at ends, 5 ft. 9 in. long, white oak. Decking, 1⅜ in. thick (finished), and not over 8 in. wide, lapped or halved ½ in. at joint. Four longitudinal truss-rods with turn-buckles; 4 cross trusses ⅝ in. to each transom. Brake-hangers, ⅝ in. round iron, with ⅝ in. eye-bolt, the outer one going through end-sill with nut let in on top.

For coal car, 2 sides, 2¾ × 15 in. × 26 ft. 5 in. long, with 6 stake-pockets each; 2 end-gates, 2¾ × 15 in. × 8 ft. 1½ in., with 2 pockets each—the timber being clear, hard, yellow pine. Four extra pockets each side for timber stakes. Car painted with 3 coats Cleveland iron-clad mineral paint.

The standard freight trucks of the road are used, as described in the CAR-BUILDER for September.

End-Windows in Cars not Needed.

A correspondent, in speaking of a certain narrow-gauge passenger car of superior finish and workmanship, says: "It has the usual end-windows in conformity to custom, I suppose, although it is difficult to see what real necessity there is for these windows in any ordinary passenger car. So far as use is concerned, they are about as serviceable as a fifth or seventh wheel to a truck. In many cases only one has a seat alongside of it, while the other three are covered by closet and stoves. Sometimes the fourth has a water-cooler in front of it. They serve as a receptacle for dust



in summer, and let in the cold air in winter, and the cost of replacing broken glass is more for these end-windows than for all the others. One side-window is certainly enough for the saloon, and more than enough for the stoves. Then why not dispense with end-windows altogether and add to the strength of the body frame where it is most needed to hold up the heavy Miller and Janney platforms that are now so much used ?"

Woodruff Sleepers for a Southern Road.

Two of these cars, recently built by the Harlan & Hollingsworth Company, Wilmington, Del., for use on the Jacksonville, Pensacola & Mobile Railroad, are thus described: Each car has ten sections with double berths below and single ones above, the upper ones being provided with ventilators and lockers for valuables. The lower ones are formed from the car-seats by a new and ingenious plan. Paneled partitions are also so arranged as to make each section a kind of state-room by itself. The lower berths are also supplied with lockers for valuables and pockets at the foot for clothing and toilet articles, also an electric button connected with an annunciator in the gentlemen's saloon for calling the porter. Beneath the seats there is a cavity extending below the car-floor, in which the bedding is stored during the day. Double windows of heavy plate glass secure the inmates from dust. The backs and bottoms of the seats are so arranged as to be formed into reclining chairs during the day, set at any desired angle to enable the occupants to change position. The ladies' saloon at one end of the car next the heater is of ample dimensions and furnished with toilet conveniences, its privacy being secured by shaded plate-glass doors. A luxurious cushioned seat runs along the wall from the partition to the outer door. The rounded end of the car has large windows which afford both an end and side view. The upholstery is rich and substantial. In the other end of the car are a capacious linen locker and wash-room for gentlemen, also a smoking room. The platforms are enclosed with railings and gates where passengers can sit and enjoy the outer air. The cars are equipped with the Westinghouse air brake, and cost about $8,500 each.

An Inquiry About Black Oil.

To the Editor of the National Car-Builder :

Have you any information sufficient to base an opinion upon as to the effect of black oil when used upon flues and crown-sheets of locomotives to prevent scaling? I would ask also, if a gas is formed by the chemical action of black oil and water, containing certain impurities which tend to cause explosions? MASTER MECHANIC.

THE maximum average of passenger train speed on nine of the principal railway lines in England is 46½ miles per hour.

THE Ohio Falls Car Co., at Jeffersonville, Ind., has been shipping freight cars to the Illinois Central, the Wisconsin Central and the Chicago, Milwaukee & St. Paul roads.

A GENTLEMAN whose opportunities for forming a correct judgment are excellent informs us that 20,000 additional freight cars are wanted on the roads east of Pittsburgh, and that this demand will necessarily advance the price of cars and car material very considerably in the near future.

Communications.

The Painting of Passenger Cars.

To the Editor of the National Car-Builder:

One of the topics proposed for discussion at the last meeting of the Car-Painters' Association was in reference to the most economical and durable color for the outside painting of passenger cars. But, aside from the reading of a valuable paper by Mr. William Davis, of the Canada Southern Railway, the subject received but little attention. This was probably owing to the fact that railway managers, as a general rule, decide for themselves what shall be the color of the cars on their respective lines, without consulting the painter in the matter of durability and economy.

Practical car painters—the writer of this claiming to be one of them—have not failed to observe the various colors that have been used for twenty-five years past on the passenger cars of the country; the life of the different colors has been carefully noted, and experience has taught us that there is a great difference in the durability of colors. Some may think that *any* color protected with varnish will wear equal to any other color; and this theory has been advocated by men with a great amount of knowledge—in their own estimation—but with no experience whatever. They suppose that, inasmuch as varnish is a protector, the color has nothing to do with the wearing of the varnish. But no practical man can be convinced of it; their experience has taught them better. Railroad officials are too much disposed to underrate the importance of the finish given to cars in the paint shop. The painting is regarded by them merely as ornamental, and a protection to the material. As regards economy, if it is considered at all, it is made quite a secondary matter. The adoption of a color is too often a mere freak of fancy, or perhaps a servile imitation of some other road. How many of our railroad superintendents and managers have ever had the wearing qualities of a color tested by the foreman painter of the road before adopting it? Not many, we venture to say; yet they will wonder why it is that the paint on their cars don't wear better.

From long association with master car-painters, the writer feels warranted in saying that no class of mechanical artisans are more ambitious to excel in their work than they, or take a greater personal pride in turning out a good job. The painting of a car, and especially the finishing processes, require constant attention, which is not infrequently mingled with much anxiety; for even in cases where the most care has been taken, the results are not always the same. A hurried and careless job will sometimes stand better than one upon which the most time and care have been expended. This, however, is exceptional, and is no argument for hurried work. Most car-painters know this from experience. If there are any who do not, they have been peculiarly fortunate.

In order to show how colors differ in respect to durability, we may go back to the time when light colors were the rule—say twenty years ago. Any one who has noted the changes that have taken place during this interval, will be forced to admit that none of the rich dark shades that have been introduced can compare with the cream, lemon and straw colors so much in use years ago; and, indeed, there are many roads that still adhere to these colors, the principle ingredient of which is white-lead, which is by far the best pigment as a basis for a durable finish. A certain road might be named which has, during the past year, returned to its standard shade of light yellow for passenger coaches, instead of the dark umber it has been using for eight years.

We advocate light colors, because they have life in them, not only in appearance, but in their wearing properties. They are more durable than the darker shades, and, of course, more economical. They are better adapted for decorative work, while every painter knows, that when light colors are used, a car can be painted from the foundation upward, ready for decorating, at a much less expense than a dark-colored one. Imperfections in the finish of the wood-work also, will show more plainly on a dark color, and consequently more care must be given to leveling the surface. Dark color absorbs the sun's heat, as every one knows, much more than light, and the more a painted surface becomes heated, the more it will bleach out. The oil is burned or dried out of the varnish and color, and decay follows. The gum in the varnish may remain on the surface of the paint, but it shrivels or becomes spongy, because it has lost its elasticity, and is consequently dead, as it were.

The life of a car that has been well painted with any of the dark colors made with raw and burnt umbers, golden ochre, ivory, drop black, Indian red, metallic browns and other minerals, does not exceed six years. This is the average, and the car must be re-varnished once a year to be kept in fair condition. This, with a general cleaning throughout, will cost $60 each year, and the car will have to be kept in the shop thirty days for the purpose, involving an expense for the six years equal to the first cost of painting. So far as relates to durability and economy, aside from any other considerations, I would prefer straw-color for the outside of cars. It will wear better than any other shade of light color—better than white, cream color, or lemon. It should be made of pure white lead, and the best orange chrome yellow, and when so made, it is the best wearing color used on cars, is less liable to fade, and makes a brilliant appearance, which is improved instead of being clouded by varnish, as is the case with lighter shades. Straw-color also admits of a thinner finishing coat than the dark colors, because the finishing coats being mostly transparent, or without body or covering capacity, a greater number of them must be used; when it is well known, that the less paint there is on a surface, so it has a solid appearance, the better it wears.

In all dark colors, a large quantity of dryer must be used, and this impairs their durability just according to the quantity used. Colors that are made with lead will dry harder with one-fourth the quantity of dryer, and this is an important point in favor of light color, while we know from long experience that these colors will wear one-half longer than the dark ones. There are many substitutes for lead offered in the market, and some of these are often highly recommended by railway officers, but it is best to let them severely alone. They are ready mixed, very convenient, and pretty sure to be patented, yet, like all other cheap expedients, they are a delusion, being composed of inferior gums, rosin and coloring, and unable to bear any satisfactory test.

There is one more reason that may be stated in favor of straw-color, and it is this: If you take two cars and paint one of them dark and the other light, finishing with the same varnish and an equal number of coats, and then put both cars on on the road, it will be found that the light car will run eighteen months, when it will clean up and varnish better than the dark car which is brought in after running only twelve months. These are facts which can not be disproved. Railroad men sometimes say: How well the Pullman or Wagner cars look, which are painted dark? Such men do not take into account the care and attention given to these cars. They rarely run more than nine months without re-varnishing; they are carefully washed every trip, and, being in the middle or at the rear of trains, are not so much exposed to the smoke and cinders from the engine. I am glad to see so many roads still adhering to light colors for their cars. To do so is true economy, without sacrificing either taste or appearance. The dark shades make a good ground upon which to show gold leaf, and thus make a display and attract the eye, but it is an expensive mode of advertising, and none but rich or well-to-do corporations can afford it. If economy is what the roads are after in the painting of cars, let them consult their foremen painters a little more, and be guided by their judgment, and one of these days we shall see straw-color, or some other shade of yellow, adopted as the standard for the outside painting of passenger cars.

BUCKEYE.

The Economical Management of Railway Mechanical Departments.

To the Editor of the National Car-Builder:

In no other branch of business is there so much responsibility resting upon employés, and so much need of honesty and trustworthiness, as in the mechanical departments of railroads. Nearly every one connected therewith has some portion of the company's capital, in the way of material, entrusted to his care. He is constantly surrounded by it. It is scattered over the entire line of the road, and its very abundance tends to make workmen careless and prodigal in its use. In ordinary manufacturing establishments, a strict account may be kept, and a waste of material prevented by giving out only so much as is actually required for the particular work in hand. But it is otherwise with railroads. The work to be done is so diversified, especially in repairs, the requirements are so various, and the kinds of material so numerous, that the chances for leakage and waste are greatly multiplied. On this account it is important that, in the selection of men, only those should be employed that have some knowledge of the value of material, and who are honest enough to make an economical use of it. Every shop superintendent is aware of the great difference in men in this respect. Some avoid all unnecessary waste as scrupulously as if the material was their own, while others are indifferent and even reckless, paying no heed to considerations of economy. "The company pays for it, who cares?" is a remark that is often heard among shop hands, but of course in more or less of an undertone. It is on this account that

SHOP FOREMEN

should be selected with care and discrimination. Their executive capacity, personal habits, knowledge of men, etc., should be well considered. If they are promoted from the ranks, it should be ascertained whether they have been wasteful or economical in their work, or prone to idle away time as often as opportunity offered. Their peculiarities in these respects, whatever they may be, are sure to be known to the men who come under their direction, and they will be influenced accordingly. Those who are naturally disposed to idle and shirk, or play "soldier," as it is termed in shop parlance, will do so if the foreman is known to be of that class. If pushed, they will get angry; and an angry man is worse than no man at all, for he is apt to be malicious. If a foreman is morose and snappish; if he has an idea that discipline depends upon the number of oaths he can utter, and the petty slurs he can cast on the men under his charge, the company will be out of pocket several times the amount of his wages annually, and for reasons that are too obvious to need specification. A foreman who has a repulsive manner prevents workmen from making necessary inquiries, and places them in an unpleasant position. He often fails to give clear and definite orders, and blames workmen for inferring or not inferring something aside from such orders. The result is, that in such cases men become more or less demoralized and indifferent, and do what any man *can* do in a repair

shop, if he is so disposed—steal from ten cents to a dollar's worth of time every day, besides wasting material which might just as well be saved.

As an illustration of what has been said above, the writer noticed in a shop the other day, a young man busily engaged at his work, and with a seeming interest in it; but as he worked, he whistled. The foreman came along, and remarked, by way of rebuke, "Less noise, and more work." The noise stopped, and so did the work, to an extent perhaps that taxed the company a dollar or so for the day.

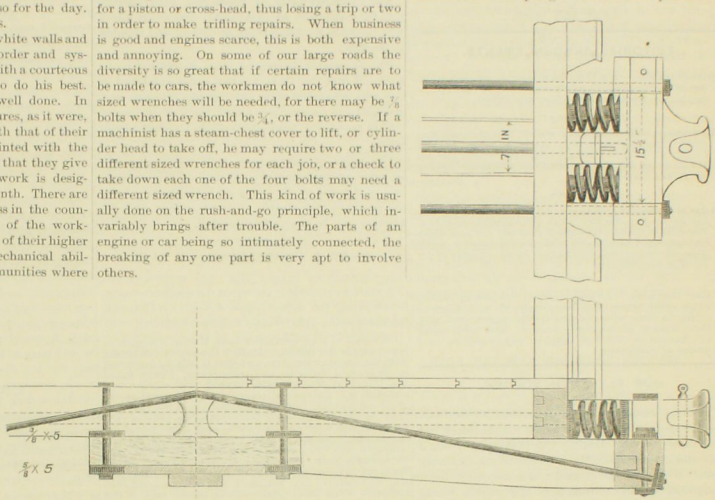
SHOPS AND SHOP YARDS.

An airy, well-lighted shop, with white walls and general cleanliness, combined with order and system, is the mechanic's paradise. With a courteous foreman, he is in a state of mind to do his best. The jobs that are put in hand are well done. In shops of this class, men become fixtures, as it were, and make their interest identical with that of their employers. They are so well acquainted with the work, the tools and regular routine, that they give a foreman little trouble after the work is designated for the day, week, or even month. There are very many railway shops of this class in the country. The comfort and convenience of the workmen are looked after, and on account of their higher grade of morals, intelligence and mechanical ability, they help to form thriving communities where such shops are located. Other shops, however, are small and poorly lighted—two of the worst features that can be imagined. There is a great lack of windows, and what there are are apt to be coated with an accumulation of oil and smoke. The walls are dingy, and seem to say that daylight, or even its reflection, must be kept out as an abomination to the inmates, like a life-convict's cell in the penitentiary. What windows there are, are often 12 or 15 feet from the floor. The help at such shops is mostly transient. If men of a better stamp make a chance stop, they are inclined to get away as soon as possible. The bummer class stay and raise what is termed a "stake," and then leave. They take no interest in any thing except their pay, have no home or local attachments, jump their board and washing bills, and lead a kind of tramp life. They never learn the ways of the shop so as to work to advantage, and a discharge gives them no uneasiness.

The shop yards, in such cases, reflect the condition of things in the shops and the qualifications of those in charge. The yards of well-managed shops will be in perfect order. Not a scrap of material will be found out of place, and every thing is arranged with a view to economizing labor. Other yards, however, are a mass of accumulated *débris*, in many cases mingled with new material, so that when any particular thing is wanted, a general hunt takes place to find it. There is a place for every thing, but it is entirely accidental, or where the thing was dropped or happened to be when last used.

DUPLICATE WORK.

The duplicate system, where it can be carried out, is undoubtedly one of the best systems extant for promoting economy in the mechanical operation of railroads. It tends largely toward keeping rolling-stock in motion and facilitating traffic. Were it possible to have a standard freight car, the vexatious delays now occasioned by broken cars standing on side tracks, waiting for material suitable for repairs, would be avoided. The number of cars now laid up in this way, and the damage caused thereby, are almost beyond computation. In the locomotive departments, where the whole matter is controlled by each road company, the duplicate system can be more easily established by bringing all new work to a standard. Roads that have been pursuing this system for a few years only, are realizing its advantages. Engines are rarely detained for repairs for a longer time than their usual lay-over, and when disabled on the road the part broken is telegraphed for and the engine speedily put in order for the completion of its trip. On roads where the system has not been established, it is no unusual thing for disabled engines to be detained from four to six days for a piston or cross-head, thus losing a trip or two in order to make trifling repairs. When business is good and engines scarce, this is both expensive and annoying. On some of our large roads the diversity is so great that if certain repairs are to be made to cars, the workmen do not know what sized wrenches will be needed, for there may be $\frac{7}{8}$ bolts when they should be $\frac{3}{4}$, or the reverse. If a machinist has a steam-chest cover to lift, or cylinder head to take off, he may require two or three different sized wrenches for each job, or a check to take down each one of the four bolts may need a different sized wrench. This kind of work is usually done on the rush-and-go principle, which invariably brings after trouble. The parts of an engine or car being so intimately connected, the breaking of any one part is very apt to involve others.



PLAN FOR PLACING DRAW-BAR ON LINE WITH FLOOR TIMBERS.

The difference between the duplicate and non-duplicate practice is very well illustrated by the experience of a certain veteran master mechanic on one of our roads, who found the running repair expenses of his engines much larger than he could account for. On investigating the matter, he found that nuts cost from 40 to 60 cents each, instead of 5 cents; keys from $1.50 to $2.00, instead of from 25 to 40 cents; and other things in a like ratio. He at once arranged a separate department for this class of repairs, and established the duplicate system, the result of which was a reduction in the cost which far exceeded his expectations. Work done by the quantity is much cheaper and better than by the single piece and in a hurry, as is usually the case when an engine is waiting.

ASHLAND.

Drawing and Buffing on Line of Floor Timbers.

To the Editor of the National Car-Builder:

In my communication published in the November CAR-BUILDER, an attempt was made to prove that freight-car bumpers are put in the wrong place, and that the springs used with them are insufficient to withstand the concussion to which they are subjected.

I now submit my plan for a remedy, the nature of which will be understood from the above drawings. It is simply a plan not yet practically tested, and can perhaps be improved upon to some extent, its object being to place the drawing and buffing attachments so they will be on a line with the floor timbers instead of underneath. The coupler and buffer is a casting, say 15½ in. wide by 17 in. extreme length, a proportion which ought to insure the needed strength. The two right angles formed by the part which extends between the springs can have corners filled up top and bottom, the springs leaving the space for that purpose. The springs are two-coil spirals, 5½ × 7, with projections from bumper and inside sill, as shown. The projection from the sill may be attached thereto by means of a ½ or ¾ inch plate. The outer sill is the thickness of the floor wider than the inner one, and from its bottom edge at the centre is cut out 5½ × 15½, the top corners rounded to fit the springs. There is also provision for a continuous draw-bar, which would not go through either the transom or stiffners, and although it would go through the inner end-sill, the additional timber in outer one, together with long truss-rods, will compensate for any loss of strength. The use of an additional spring and a little more timber is nothing, if it helps to keep the cars on the road and out of the yard. The transom, as it is shown in the drawing, is not claimed to be an original idea, as I think I have seen it somewhere on passenger cars, but it is well suited for freight, as it lessens the leverage which breaks the sills.

In my previous article it was stated that 38 broken sills had been removed in one car shop in three weeks. Since then we have removed 81 in four weeks, which to me argues strongly of wrong construction and false economy in the use of springs. I do not consider "dead-wood" blocks as proper buffers, but only as a kind of reserve in case of emergency. Hitting a car a 25-ton blow is not a good thing, but it is often done in the operation of running switches. SPECIO.

IN the Philadelphia & Reading shops, at Reading, Pa., a new passenger locomotive has been completed which uses coal dirt as fuel. It has four driving wheels, each five feet seven inches in diameter, and four truck wheels, each 30 inches in diameter. The fire-box is eight feet long by 8¼ feet wide.

SUPERINTENDENT SHALER of the J. M. & I. R. R., is having the roofs of all covered bridges on his line raised so that brakemen on top of cars will not be struck by them. One of these bridges has killed 18 men and seriously injured as many more.

The National Car-Builder.

PUBLISHED MONTHLY

BY

R. M. VAN ARSDALE,

5 DEY STREET ..... NEW YORK.

JAMES GILLET, Editor.

JANUARY, 1880.

EDITORIAL ANNOUNCEMENTS.

Subscription.—ONE DOLLAR *a year in advance, postage prepaid. One copy will be sent free for one year to any person sending us five new subscribers.*

Addresses.—*Business letters should be addressed, and drafts and money orders made payable, to* THE NATIONAL CAR-BUILDER. *Communications for the attention of the Editor should be addressed* EDITOR NATIONAL CAR-BUILDER.

Advertisements.—*Nothing will be inserted in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *The editorial department will contain our own views and opinions; and the rest of the reading matter, aside from advertisements, will be such as we consider of interest to our readers.*

Contributions.—*Articles relating to railway rolling stock construction and management and kindred topics, by those who are practically acquainted with these subjects, are especially desired. Also early notice of changes in railroad officers, organizations and names of companies.*

OUR ELEVENTH VOLUME.

As announced in our last issue, the CAR-BUILDER begins the new year under a new management and with a new dress. During the past nine years it has aimed to promote the interests of car construction, so far as the support and encouragement extended to it by railroad men and others would permit. The field, however, is a large one, constantly widening, and to occupy it fully requires more extensive facilities than we have heretofore been able to command, as well as a more earnest and effective cooperation on the part of railroads and car-builders.

In the new departure, of which this is the initial number, it is the intention of the proprietor of the CAR-BUILDER to make it as far as possible a representative journal of the great industry whose name it bears. Each number will contain original engravings illustrative of some of the many features and details of construction, including new devices and inventions pertaining thereto, accompanied with suitable descriptive articles; also selected matter and contributions containing the views of practical railroad men relative to car and locomotive construction, repairing and management. In addition to these leading features, due attention will be given to current railway news, local correspondence, equipment and manufacturing items, the interests of train-men and other employés—in short, whatever will tend to make the CAR-BUILDER an acceptable visitor in railroad and business offices generally, and especially in machine and car shops.

In view of the amazing growth of railways and railway transportation, it is a singular fact that no book or special work has thus far been published relating specifically to car construction. The CAR-BUILDER will aim to supply this deficiency, so far as it can be done by a monthly journal. But we desire to impress upon railroad men, and especially upon managers and superintendents, that the success of our efforts will largely depend upon their valuable aid in giving us access to shops, the use of drawings, and such information as they may be willing to impart, in reference to new methods, appliances and improvements. We have received from a number of sources assurances of such aid, and earnestly request that it may be extended to us from every road shop and railway office in the country. In our notices of new devices and novel features in construction, it will be our purpose, not so much to recommend, as to place them upon record for convenient reference, leaving our readers to judge for themselves as to their intrinsic worth.

The Directory Lists of roads and road officers will be continued as heretofore, and every effort will be made to make them as correct and reliable as possible.

The proprietor desires to have it distinctly understood that the CAR-BUILDER is not identified in any way whatever with any outside interest; and also that the reading portion or body of the paper will in no case be made the vehicle for paid advertising.

The price of subscription will be $1 a year in advance, postage prepaid. If any of our subscribers at the end of the year shall think they have not received the worth of their money, the deficiency will be promptly refunded.

WHAT A CORRESPONDENT SAYS.

A master car-builder on one of the southern roads, in renewing his subscription to the CAR-BUILDER for the coming year, writes to us as follows:

"I notice in your December issue, that a change is to take place in the management of the paper, beginning with the January number, and that it will be improved in its general character and appearance. I have taken the CAR-BUILDER regularly since it first started, and although it is not such a representative journal as the great car-building interest ought to have, I feel that it is fully as good, and even better, than the price of subscription will warrant. No such paper as we would desire can be furnished for such a price. I would, myself, willingly give $20 a year for a journal that could give us monthly such drawings and illustrations, setting forth the diversified details of construction in such a way as to make it a standard authority among car-builders; or at all events, let those in one part of the country know what the shops are doing in other parts. In no other way can we make progress in technical details, by finding out what is best and adopting it in place of what is not so good. Uniformity, about which so much has been said, can never be attained unless we are all better posted as to what each is doing. There are plenty of books and publications about bridge and house building; but as for railroad cars of any class, there is nothing to be had. Go where you will, the individual ideas of master car-builders—or perhaps I ought to say, railroad managers and superintendents—are apparent in their work, and in many cases the performance is not creditable to the designer, builder or road.

"I hope you will meet with such encouragement in your new departure, as will enable you to enlarge your paper, and send out weekly or monthly from your metropolitan center, such illustrated designs and improvements in construction, as will make every railroad manager feel that it is his duty to consult it."

We entirely agree with our correspondent in his views about a journal specially devoted to the car-building interest. The field is a large one, and we would like to print a paper that would cover the whole of it, by giving in each issue an account of what is being done in every road and contract shop in the country, with full-sized working-drawings, and every technical detail. But the practical obstacles in the way of such an achievement are very great, so formidable, indeed, that it would take a mint of money to remove them. We must first get the desired information, before we can publish it. The shops are many of them close corporations, so to speak, and the persons in charge of them have but a limited discretion in the matter of imparting information or furnishing drawings for publication. We can only get what we can. If railroad men would give us their aid and coöperation a little more freely, it would enable us to publish and send out—not, indeed, such a paper as our correspondent would like, for that would be as much out of the question as would be the universal adoption, by all the roads in the country, of a patented standard draw-bar and coupler—but a paper that would be worth a great deal more than the CAR-BUILDER's present price of subscription. We shall try during the current year to do what we can in this direction, and hope our correspondent and others who share his views, will do what *they* can to aid us in our efforts.

PRELIMINARY AND WORKING TESTS.

In railroad construction and operation there is not only a great diversity in the forms and patterns of minor details, but there is also a similar diversity of opinion as to the comparative merits and advantages of different appliances designed to effect the same objects. A great many problems that seemed quite simple when first presented, have become practically very complex and difficult. They are found to involve questions pertaining to the hidden forces and subtle elements of matter, in regard to which scientific knowledge is imperfect and limited. These questions relate to the qualities of metals and causes of fracture, the resistance of trains, the comparative economy of large and small wheels, gauge of track, size of journals, proportions of dead and paying weight, the most economical speed for freight trains, the mysteries of friction and lubrication, and other things of a like nature. After an experience of thirty years, during which railroads have been operated upon an extensive scale, and under the supervision of the best mechanical and scientific skill, it would seem that some of these problems would have so far settled themselves as to preclude any further discussion or uncertainty about them. Such, however, is not the case; and the result is doubtless due, to a considerable extent, to imperfect preliminary testing of the strength and wearing capacity of materials. The testing that is done by individual roads and supply manufacturers is apt to be conducted in a loose, irregular and unscientific way, giving results that are at variance with other tests of a similar kind, or with the tests of actual service. It is very apt to be assumed that a testing machine handles whatever is put into it in just the same way that such material is handled in its place on the track or in moving trains. But this is assuming too much. Every one knows that a car-spring or a tie-rod, for example, is subjected to strains in practical running quite different from what it has to bear in a mere tester—the difference being comparatively as the treatment a model coupling device receives in the hands of the inventor, and the treatment the device itself receives on a traveling freight train. A few years ago, as some railroad men will remember, a new style of elliptic spring was introduced, which worked beautifully in the tester but failed entirely on the roads—its performance under the cars being the only test as to endurance, to which it could be subjected. As another illustration, a master car-builder, connected with one of the great trunk lines, not long since made a test of the tensile strength of tie-rods of different diameters but of equal lengths. Each of them parted very nearly in the middle, while in practice they almost invariably break in the thread near the nut.

In these cases the experimental tests produced one result and the practical working tests another. The reasons are quite obvious. The elliptic spring was subjected to a transient strain only while in the tester, and bearing no proportion to the continuous working strain, along with the shocks, jars and vibrations of practical running. The case of the tie-rods was similar. In the test, they were subjected to a breaking strain at once, without the jarring or concussion which in running, and under long continued strain, produces at the point where the thread cuts into the rod a gradual crystallization or change in the metal, which, with the partial shoulder formed by cutting the thread, is ex-

ceedingly favorable to fracture. Other cases might be cited showing the unreliability of tests in so far as they do not deal with the important element of *time* as a condition of actual service.

In the matter of oils for lubricating purposes, there has been a great deal of scientific analyzing and testing, with but indifferent results, so far as determining what are specifically the best oils for railroad uses. There are so many adulterations and mixtures so difficult to detect, to say nothing of the pressure, velocity and temperature of the surfaces to which the lubrication is applied, that it is no wonder the more the subject is investigated the more bewildering it becomes. In respect to tests, what railroad men most desire to know is not the chemical affinities, specific gravities, and a host of curious things evolved by the refining and analyzing processes of the laboratory, but the particular kind of oil or lubricating ingredient that will keep an ordinary car journal from getting hot while in ordinary service, and with the least consumption and waste. A preliminary laboratory test is very well as an indication of what may be expected of the lubricant, but it is nothing more than an indication, because the test is an arbitrary one. The final test is the running of the journals themselves in making their regular mileage with average speed and loads, and this may or may not coincide in all respects with what was indicated beforehand. At present, there is an absence of positive knowledge in reference to the behavior of lubricants on car journals, and the current opinions upon the subject are to a great extent chaotic.

RAILWAY READING ROOMS.

One of the interesting phases of railroad progress—perhaps we should say, of railroad management—within the past few years, is the establishment of reading rooms in connection with the general offices at prominent stations. We do not know what particular company is entitled to the honor of their first introduction, but the originator of the idea, whether an individual or a corporation, should be held in grateful remembrance by the thousands of railway employés who now enjoy the privileges thus provided. Although the movement was at first regarded as an innovation the utility of which remained to be tested, they soon became a marked success, enlisting the favor and encouragement of managers and high officials. There was an imperative and growing necessity for such a movement. The several grades of railway service constitute a vast army, the rank and file of which are largely recruited from the laboring classes of the community, many of whom have little or no education, in the broad sense of the term. To treat this lower and larger class as if they were mere animated machines, who were neither to be petted, encouraged nor respected, but whose sole business it was to obey orders mechanically, may have been considered in the earlier stages of railway development as the proper kind of discipline—about all that could be expected from "soulless corporations." But the rapid increase of these agencies of moral and mental improvement has proved that railroad managers are not indifferent to the well-being of their employés, and that they fully realize the fact that the higher the bone and sinew of the service are raised in the scale of intelligence, the more money the roads will earn.

The expenses of these rooms are, we believe, in every case borne by the companies. They are spacious, well lighted, warmed and ventilated, located so as to be easily accessible, and furnished in a style that makes them attractive places of resort. They are well supplied with newspapers and magazines, stationery, etc. Many railroad and other journals are donated by their publishers, and the nucleus of a valuable library of standard books has already been formed in many cases by the generous contributions of railway officials and others. Concerts and social entertainments for visitors and their families, and religious services on Sundays, are also conspicuous features of the management of these rooms. The ultimate effect of all this upon the *morale* of the service must be highly beneficial. A community of interest and feeling is established between the higher and lower grades. The hard-worked train-man can have an agreeable respite during the intervals of toil. He will be less inclined to seek recreation in vicious indulgencies which are a tax upon his slender earnings. A means of education, to a certain extent at least, is placed within his reach by the generosity of his employers, and designed for their mutual advantage. There are, of course, many engineers and freight train-men, whose duties are much of the time so heavy and continuous as to prevent them from enjoying reading-room privileges. This, so far as it is the case, is to be regretted, and it is to be hoped that the same influences that have led to the establishment and maintenance of these rooms, will operate to lessen the burden of overwork of which train-men have at times so much reason to complain.

PREVENTION OF RAILROAD ACCIDENTS.

A bill has been introduced in the United States Senate to prevent railroad accidents. Considering the injuries and loss of life resulting from this particular class of accidents, the initiatory steps for their prevention should have been taken at an earlier day—but, better late than never. It is gratifying to know that, perhaps by the end of the present year, people can travel on railroads with safety; and this is the way of it: The roads are to be compelled to use on their cars "such inventions and improvements as actually contribute to the safety of passengers," and a commission of ten persons is to designate the inventions that are to be so used. If any of them are patented—a highly improbable contingency!—the royalty to be paid is also to be prescribed. Aside from the complete cessation of accidents which would presumably result from the enforcement of such a law, there would be other advantages. It would relieve the Car-Builders' Association from any necessity of recommending or advertising patented inventions, and the roads using those prescribed by the act from any responsibility in case an accident should occur—because nobody would be to blame. The progress of this bill through the stages necessary to make it a law will be watched with lively interest.

OUR DIRECTORY.

The list of roads, with the names and address of superintendents, master mechanics, etc., which we publish every month, is a feature of the CAR-BUILDER that is much valued by a large class of readers, for its convenience of reference. It is, we believe, the only list of the kind that is corrected every month; and, in order to make it reliable, it is important that we should have early advice of all changes that are made. This, it is very difficult to get, unless persons connected with the road offices will take the trouble to inform us. We have no patent, infallible means of knowing when any of these officers die or resign, but have to rely upon verbal, written or printed information, as the case may be. In one respect, our experience in this matter has been a little peculiar. A man filling a position in the mechanical departments, happens to die or resign, or is "kicked out," and after two or three months, his successor or some one else knowing all about it, seeing the name still in our lists, writes us a carping letter saying that Mr. So-and-So left the road long ago, but forgetting to give the name of the present occupant. Others of a more diffident turn of mind, apologize for "taking the liberty," etc., while others still, seeing their names in the lists when they ought to be out, or out when they ought to be in, never think of wasting a postal card and a minutes' time, to set us right. This is the case more particularly with respect to the locomotive and car departments, the changes in which are not so frequently announced by printed circulars, or if so, we do not get them.

Now, we earnestly request all our readers who are connected with railroads to refer to our lists and report any inaccuracies they may notice in the names and places of address—each for his particular road. We have no wish to be instrumental in having any one's correspondence sent wrong, or of causing any of the ten thousand business circulars soliciting railway patronage to fail of reaching their destination. We have repeatedly called the attention of our readers to this matter, and we now do it again, because we believe there is nothing like persistent hammering when a point is to be carried.

There are several hundred roads in the country, organized, projected, in progress, or partially operated, the names of which are not in our lists. We insert only such as run regular trains, according to schedule time, and have a regular list of officers such as are designated in our lists. To make room for all the others, would require more space than we can spare, and unnecessarily encumber our directory.

OUR RAILWAY BAGGAGE SYSTEM.

There is not much probability that the present system of transporting passengers' baggage in this country will very soon give place to any thing better. It is an established custom sanctioned by popular approval and railway practice, and this is equivalent to law. Its inequality and injustice, however, are none the less, for all that. In accordance with this custom, the roads perform a service for which they are not paid, and a discrimination is made by which one passenger is made to pay part of the cost of carrying another passenger, when fair dealing requires that they should both be placed upon an equal footing. Two persons, for instance, pay the same fares, on the same train, for the same distance, one of whom has 100 pounds of baggage, and the other none. The first one not only has his baggage carried, checked and handled without charge, but the road company is also responsible for its safe delivery at the point to which it is checked; while the other imposes no such trouble or responsibility on the company at all. It may be said, of course, that a person who travels without baggage has the same privilege as one who travels with it, and if he does not choose to avail himself of it the fault is his own. This, although plausible, does not reach the equity of the case. Every pound of weight added to a railway train, whether it be in the form of personal baggage or car material, increases by so much the cost of running it. The hauling of 100 pounds of baggage is a work that can not be done for nothing. Why, then, should not the owner of it pay for its transportation, in addition to his own regular fare; or, if he is not required to pay, why should not a person going the same distance on the same train, but with no baggage, be carried for a proportionately less fare? There is really no reason, except a prevailing custom, why he should not; and this is the whole of it in a nutshell.

The express companies, with their effective machinery for collecting and delivering packages, have greatly interfered with the baggage-car traffic of passenger trains, but still there is a great deal of it done on trains that have no express cars, and the income therefrom is very considerable, and would be vastly more if passengers' baggage were includ-

ed. This gets carried, say from New York to Chicago, at express speed, without charge, merely because every 100 pounds of it is represented by a passenger in another part of the train who has paid the same fare as if he had no baggage. Under this system, there is no inducement whatever for a passenger to travel light, unless it is to save city express charges on his trunks and the trouble of getting checks. Any thing not exceeding 100 pounds can be carried a thousand miles, more or less, without a cent of expense for the rail distance, while it costs fifty cents or a dollar to get it to or from the train on starting or arriving. It is hardly to be expected, in view of the fierce competition between rival lines, and the custom which has so long prevailed, that the time will ever come when the roads will charge for every thing that goes into a baggage car. But it does seem that the limitation of 100 pounds might be considerably reduced, with advantage to the public as well as to the roads. It is this excessive liberality on the part of the roads that has more than any thing else made the traveling with a mountain of baggage a characteristic feature of American life. One man travels 10,000 miles in a year, and carries nothing but hand-baggage; while another, with his family and six or eight Saratoga trunks, travels 500 miles in the same time. Upon English and Continental roads, the limitation ranges, we believe, from 50 to 65 pounds, and is strictly enforced, while the much larger allowance granted by ours is enforced with far less strictness.

THE WAGES OF EMPLOYES.

If the great mass of railroad employés, especially those constituting the lower grades, could give their individual experience as to how they have managed to feed, clothe and shelter themselves and their families during the hard times, cases of want and suffering would be revealed that would challenge the earnest sympathy of the well-to-do portions of the community. The contagion of fast living, or living fully up to their earnings and even a little beyond, affected all classes during the flush times which preceded the great panic. The day laborer and those who worked for wages were no exception, but these latter paid a sharper penalty for their indiscretion. Those who were not thrown out of employment altogether, had their accustomed pay cut down from month to month and from year to year, until the vanishing point seemed to be reached. A thousand little economies of the most pinching kind had to be practiced, with absolute beggary looming up in the distance. Yet the great majority of these sufferers endured their privations with the cheerful hope that better times were just ahead, gave no countenance to the riotous demonstrations of 1877, and rested in the assurance that when the tide turned and railroad business should again become prosperous, they would share in such prosperity by an approximate restoration of their former wages. Well, the tide *has* turned. The roads are over-burdened with traffic, there is a general increase of earnings, their securities have greatly advanced in price, and all the signs indicate a prosperous future. Under these favorable circumstances, it is right that the poorly paid and over-worked employés should have their wages scaled up, not grudgingly and reluctantly, and in response to clamorous solicitation, but voluntarily and without asking. These men are not deaf, or insensible to what is transpiring in high business and financial circles. They read the newspapers, and keenly appreciate the booming announcements of the great revival of business throughout the country. They remember the promises made to them during the dark days, that when the railroads should get upon their feet again, their pay should be increased. In a few noted instances this has been done, but we think if the movement were more general than it is, it would be to the mutual advantage of all concerned.

CAR-BUILDERS' MONTHLY MEETING.

The first meeting of the season was held at the association rooms in this city Dec. 18, the subject discussed being the necessity of a standard system of screw-threads and the best methods of maintaining exact sizes of screws, so that bolts may always be interchangeable. The attendance was very good, and consisted mostly of bolt and nut manufacturers or their agents. Mr. William Sellers, of Philadelphia; Mr. Chanute, of the Erie Railway, and others took part in the discussion. The difficulties in the way of establishing exact and uniform sizes were dwelt upon, and appeared to be so formidable that the meeting adjourned without agreeing upon any definite plan for their removal. A summary of what was said would be little else than a repetition of what has often been said before. The difference in standards caused by individual roads adhering to their own, or buying their taps and dies of different manufacturers, was the great trouble, and as long as this continued, interchangeability was out of the question.

ENGLISH AND AMERICAN RAILWAY CARS.

Americans nowadays travel so much in Europe that it is not surprising that comparisons should often be made between the railway systems there and here. From a home point of view, such comparisons are almost always in favor of our own roads, and especially our passenger car equipment, as contrasted with that of English roads. It is a wonder with many how it is that so many intelligent and observing Englishmen travel over our roads and enjoy the conveniences and luxuries of our commodious cars, from the ordinary day-car to the finest and costliest palace coach, and not transplant these ideas more rapidly on the other side. The progress in this direction is necessarily slow. The splendid coaches introduced there by the enterprise and persistency of the Pullman Company, are naturally looked upon by the rustics as something quite too fine for every day use, but they are appreciated more and more by the intelligent and wealthy classes. A perfect road-bed and track the average Englishman can understand, also an engine with six or seven-foot drivers, speeding like a bullet, with a string of diminutive carriages trailing behind for an indefinite distance. But these carriages, with their side-doors, compartments and closed ends, with no trucks, bell-cords or stoves, are so many connecting links with the past which no Englishman with a proper respect for Magna Charta would consent to have rudely displaced. The Pullman cars present such a violent contrast to these vehicles of ancient pattern, that the juxtaposition of the two may have the effect to retard rather than hasten the change. Your genuine Englishman has a chronic dread of innovation of the startling kind, and when any reform is to be introduced, the taper end stands the best chance. The chasm between an English "carriage" and a Pullman sleeper might be bridged over, as it were, by the gradual introduction of our common day-cars of moderate length, with trucks and only side-doors at first, and afterward end-doors and platforms, and finally bell-cords, stoves, ventilators, and all the modern improvements. The class-system, however, would have to be retained and rigidly adhered to, because any relaxation of that would rock the foundations of the realm, and possibly demoralize the "guards," who collect the tickets. The discrimination of classes by these servants of the companies is sometimes quite amusing to outsiders who are temporarily stopping on the Island. "Tickets, ladies and gentlemen, if you please," is the usual salutation to first-class passengers; "Tickets, please," to the second class, and simply "Tickets" to the third class—a graduation from highly deferential to rude, with an intermediate of passable civility.

To get a Yankee idea thoroughly domesticated in England is no trifling achievement. Whatever bears a Yankee label is put upon long probation; but the American style of car is bound to win, because England cannot afford to be fifty years behind the age. The Pullman coaches have got a permanent foothold there as well as on the continent. The only ungracious thing about it is, that we on this side can not reciprocate by adopting any European improvements, or modifying our present style of passenger cars to conform to any that are now running, or that are likely to run, in any part of the world. This may savor a little of boasting, but facts can not well be blinked out of sight.

THE *Railway Age* appears in a new dress of clear and beautiful type, which was hardly needed to render it more acceptable as a lively, enterprising and popular railway journal.

THE *Travelers' Official Guide* will hereafter be published at 46 Bond street, New York, where time-tables, and all correspondence by post or wire relative to matter for publication, should be addressed. The office of the National Railway Publication Co. remains in Philadelphia. As a medium of railroad information for travelers, the *Guide* is without a peer.

THE divisions of the New York, Lake Erie & Western are as follows: The Eastern Division is from Jersey City to Port Jervis; the Delaware Division from Port Jervis to Susquehanna; the Susquehanna Division from Susquehanna to Hornellsville; the Western Division from Hornellsville to Dunkirk, and the Buffalo Division from Hornellsville to Buffalo; the Rochester Division is the branch from Corning to Rochester.

Our Directory.

We note the following changes since our last issue. Readers are requested to give us prompt notice of changes when they occur.

Atlantic & Gulf.—The name of this road has been changed to Savannah, Florida & Western.

Central Branch Union Pacific.—The Superintendent, Mr. W. F. Downs, will be absent in Europe six months, during which time the duties of his position will be performed by Mr. M. S. Sargent, the General Freight Agent.

Chicago, Burlington & Quincy.—Mr. Tho. J. Potter, General Superintendent, has been appointed General Manager of all the roads operated by the company—headquarters at Chicago.

Chicago & Lake Huron.—This road is now known as the Northwestern Grand Trunk, which is a reorganization of this and the Chicago & Northeastern roads.

Galena & Wisconsin.—Mr. A. J. Hellman is Superintendent, Jacob Eiseman, Master Mechanic, J. J. Ivey, Master Car-Builder, and J. J. Gray, Purchasing Agent—headquarters at Galena, Ill.

Grayville & Mattoon.—Mr. C. H. Cory is Acting Superintendent and Master Mechanic. General Offices at Mattoon, Ill.

Indiana, Bloomington & Western.—Mr. H. C. Norton has been appointed Purchasing Agent.

Logansport, Crawfordsville & Southwestern.—This road has been purchased by the Terre Haute & Logansport Railroad Co.

Long Island.—Mr. Hugh Longest has been appointed Master Car-Builder for this road and its leased lines.

Louisville, Cincinnati & Lexington.—Mr. J. McLeod has resigned the position of Superintendent, and Mr. Mm. Mahl, the present Auditor of the road, has been appointed as his successor.

Louisville, New Albany & Chicago.—Mr. John S. Day has resigned as Superintendent, after eighteen years of service.

Peoria, Decatur & Evansville.—This is the name of the new company formed by the consolidation of the Decatur, Mattoon & Southern and the Pekin, Lincoln & Decatur roads.

Sheboygan & Fond du Lac.—Mr. L. A. Emerson, who has been Superintendent for several years, has resigned, and is succeeded by E. J. Cuyler.

Locomotive Construction.

Specifications of Standard Road Engine (Class A), Chicago, Burlington & Quincy Railroad, with statement of cost of one engine built at the Aurora (Ill.) shops. The drawings which should accompany these specifications were received too late to be engraved in time for this number of the CAR-BUILDER. They will be published in our February issue.

As the actual cost of a locomotive, as a whole, is more or less of a mystery, even to railroad men, the detailed cost herewith given will be especially valuable in estimating damages, and in determining to what extent any changes in construction may affect the cost of certain parts.

COST IN DETAIL OF ONE STANDARD CHICAGO, BURLINGTON & QUINCY FREIGHT ENGINE (CLASS A).

Specifications.	LABOR.								Material	Total cost
	No.	Bl'cksmith shop.	Machine shop	Boiler shop	Copper and tin shop	Carpenter shop	Car Dept., including Carpenter, Machinist and Blacksmith	Total labor		
Fire-box	1	$9.29	$12.45	$89.38				$111.12	$234.10	$345.22
Boiler shell	2	4.00	14.12	193.75				211.87	503.51	715.39
Stay-bolts	3	1.56	3.95	54 24				59.75	42.15	101.89
Crown-bars	4	16.56	2.82	62.56				81.94	56.23	138.17
Flues	5	72	16.58		$5.43			22.73	596.06	618.80
Smoke-stack	6		1.23	1.22				2.45	19.55	21.99
Ash pan	7	1.40	24	7.89				9.53	11.94	21.47
Frames	8	67.29	45.34					112.63	78.85	191.48
Foot-board	9		5.98	2.48		80		9.27	48.91	58.18
Cylinder saddle	10	29	10.74					11.03	39.74	50.77
Cylinders	11	18	45.57		6.39	1.70		53.84	116.33	170.17
Valve motion	12	51.21	139.86					191.07	53.62	244.69
Pumps	13	3.54	31.82		3.74			39.10	89.21	128.31
Driving-boxes	14		24.92					24.92	58.48	83.40
Driving wheels	15	9.71	31.07					40.77	451.82	492.60
Trucks	16	22.39	12.30				4.12	38.81	139.78	178.58
Steam-pipes	17	71	10.14		92			11.77	42.57	54.34
Pilot	18	3.87	39			75	8.02	15.04	20.00	35.04
Cab	19	18	2.29		1.84	4.56	49.36	58.24	36.17	94.41
Running-boards	20	3.31	1.94	20				5.46	25.00	30.46
Carrying-gear	21	25.60	5.73					31.32	340.01	65.34
Boiler covering	22			27	9.11	4.89	60	14.87	42.70	57.57
Boiler trimmings	23	6.45	34.41	1.83	12.53	67		55.90	194.74	250.64
Engine trimmings	24	9.89	4.40	27.16	14.31	91	30	56.95	82.87	139.82
Pistons	25	3.71	25.25					28.96	12.41	41.36
Guides	26	8.83	18.39					27.22	11.14	38.36
Guide-yoke	27	4.02	7.13	1.40				12.56	6.43	18.99
Cross-heads	28		13.73		9			13.81	10.83	24.65
Tank-body	29	2.50	4.81	129.98			3.16	140.45	183.82	324.27
Tank-trucks	30	1.14	38				22.42	23.94	257.62	281.55
Tank-frames	31	36	12.08			6.30	18.35	37.10	64.58	101.68
Rods	32	15.97	65.81		86			82 64	50.21	132.86
Erecting	33		287.07					287.07		287.07
Bolts	34	6.62	68.78				4.37	79.77	50.67	130.43
Air-brake	35									
Tools	36								54.37	54.37
Painting	37							52.98	28.55	81.54
		$281.30	$961.70	$572.36	$55.22	$22.58	$110.70	$2,056.88	$3,748.97	$5,805.86

To this cost is to be added a certain percentage for superintendence, repairs to tools and machinery, interest on plant, and other expenses. The above is only actual labor in the shop.

Total amount of brass castings in engine	1,698 lbs.
" " cast iron " "	31,848 "
" " truck wheels	5,640 "
" " of smith furnace coal used	36,000 "

GENERAL DESCRIPTION.

Cylinders to be 17 in. diameter and 24 in. stroke; driving wheel centers to be 57 in. diameter, with steel tires 3 in. thick; gauge, 4 ft. $8\frac{1}{2}$ in.; fuel, soft coal; total wheel base, 44 ft. $1\frac{1}{2}$ in.; driving-wheel base, 8 ft.; total weight, in working order, $38\frac{1}{2}$ tons; weight on drivers, about 25 tons.

Fire-Box.—To be of the best known quality of steel throughout; to have a tensile strength of not less than 50,000 lbs. and not more than 60,000 lbs. per square inch; and a sample of which, when heated to a dark cherry heat, and plunged into water of 60 degrees, shall bend double cold under the hammer, without showing any crack or flaw. The flue sheet is to be $\frac{1}{2}$ in. thick; all other sheets $\frac{5}{16}$ in. thick, flanged, stayed, and riveted, as shown on the plan. The inside dimensions of the box are to be: Width at bottom, $35\frac{1}{4}$ in.; length, 66 in.; height at center, $69\frac{1}{4}$ in.

The fire-door opening to be either 13 × 18 in. oval, or 15 in. diameter round, formed by a flanged ring, as shown on the plan.

Boiler Shell.—To be made throughout of best homogeneous steel plate, $\frac{3}{8}$ in. thick; front flue-sheet to be $\frac{1}{2}$ in. thick. The steel to have a tensile strength of not less than 55,000 and not more than 60,000 lbs. to the square inch, and when heated to a dark cherry heat and plunged into water of 60°, shall bend double cold under the hammer without showing any crack or flaw. The main dimensions of the boiler are to be as follows: From center of smoke-arch to out of fire-box forward, 12 ft. $5\frac{1}{2}$ in.; length out to out of fire-box, $73\frac{5}{8}$ in.; width out to out of fire-box at bottom, $42\frac{3}{4}$ in.; length of smoke-arch, measured outside, 26 in.; smallest outside diameter of barrel, $50\frac{1}{4}$ in.; wagon-top to be raised 12 in. above sheet of barrel, next adjoining. Total height of back head, $93\frac{7}{8}$ in. Dome on wagon-top of 28 in. outside diameter, and 24 in. high above shell of boiler; center of dome to be 3 ft. 10 in. from face of back-head. Greatest width of boiler, measured over wagon-top, not to exceed 54 in.

Shell to be riveted with $\frac{3}{4}$-in. rivets, placed not over $2\frac{1}{4}$ in. apart from center to center. All horizontal seams in boiler and junction of waste and fire-box are to be double riveted, and all parts thoroughly stayed. The flat surfaces formed at the junction of waste and fire-box are to be stiffened by 3 pieces of heavy 3 in. × 4 in. T iron on each side, connected across above the flues by round iron braces $1\frac{1}{8}$ in. diameter.

Stay-Bolts.—Are to be $\frac{7}{8}$ in. diameter, with the exception of the hollow stays which admit air; these are to be 1 in. outside diameter, with $\frac{1}{2}$ in. holes, and not more than $4\frac{1}{2}$ in. apart between the centers. The first vertical row forward and the horizontal row at the top are to be 1 in. solid stay-bolts, drilled with a hole of convenient size, not to exceed $\frac{1}{2}$ in. diameter, which hole is closed up on the outside by riveting or by inserting a short plug, the purpose being simply that of detecting a breaking of the bolt. All stay-bolt iron is to be uniform and of a fibrous nature, soft and easily worked, and to have a tensile strength of 60,000 lbs. per sq. in., and to bend double cold without showing any flaw.

Crown Bars.—To be 13 in number, made of 2 bars $4\frac{1}{2}$ in. × 5 in. iron, welded in pairs at each end, and resting on side sheets. There are to be 10 $\frac{7}{8}$-in. bolts to each bar, with taper fit, and head under crown sheet, and strap washers and nuts on top of crown bars; crown-bar washers to be at least $1\frac{1}{4}$ in. thick, made of wrought iron, round, and tapering down toward the crown sheet, covering as little space on same as practicable; crown to be stayed by 2 braces from each crown bar to dome and outside shell. The water space around the fire-box is to be 3 in. all around, formed by a wrought-iron ring of 2 in. × 3 in. iron, riveted in between fire-box and boiler shell, with $\frac{3}{4}$-in. rivets not over $2\frac{1}{4}$ in. apart.

Flues.—To be 195 in number of 2 in. diameter outside, and 11 ft. 7 in. long, of best quality lap welded charcoal iron, to have a thickness of not less than No. 12 wire gauge with copper ferrules in fire-box end. When flattened under the hammer to show tough fibrous and close grain, and uniform metal, and when expanded and beaded into the flue sheet, to show no flaws. Cleaning-holes and brass plugs $2\frac{1}{4}$ in. in diameter, are to be put in at the bottom of the fire-box in each of the four corners, located in such a manner that the water space all around can be reached with an iron rod. A wash-out plug of same dimensions is also to be provided at the bottom of the front flue sheet, leaving at least $\frac{7}{8}$ in. metal between the plug and the lowest flue. A blow-off cock of sufficient size is also to be provided at the bottom of the fire-box in the back of the boiler.

Smoke-Stack.—To be of cast iron throughout, to have a barrel of $16\frac{3}{4}$ in. inside diameter, and a thickness of metal in barrel and top of $\frac{3}{8}$ in., to be provided with cone and spark-arrester.

Ash Pan.—To be made of $\frac{3}{16}$-in. sheet iron, with angle iron corners and stiffening pieces, to be 8 in. deep, and to be secured to the fire-box by three $\frac{7}{8}$ in. studs on each side screwed into the bottom ring, and provided with flat split-keys of a suitable size. Both front and back dampers are to be operated from the foot-board of the cab in the usual way.

Frames.—To be made of the best hammered iron, each frame to be composed of two parts, bolted together. The width throughout is to be 3 inches. The pedestals are to be made for one stationary shoe, and one movable wedge, the latter to be on the forward pedestal. The pedestal braces, or foot straps, to be of cast iron, fitted and bolted, as shown on plan, and provided with slots for the wedge bolts.

Foot-Board.—To be of cast iron, with cab-seat supports bolted on, both planed and fitted to each other and to the frames.

Cylinder Saddle.—To be of cast iron, separate from the cylinders, with center-pin of cast iron bolted on, provided with steam and exhaust channels.

Cylinders.—To be 17 in. diameter, and made for a stroke of 24 in.; to be of close-grained iron, as hard as can be worked. The steam ports are to be $1\frac{1}{8}$ × 16 in., and the exhaust port $2\frac{1}{2}$ × 16 in., and care must be taken in changing the form of the exhaust passage from a rectangular slot to a round opening of 5-in. diameter, which is the size and shape of the exhaust passage leaving the cylinders, that said passage is as free and unobstructed as possible, and of a uniformly decreasing area. The cylinders are to be accurately bored, planed, and fitted and bolted to the saddle and to the frames, and are to conform in every particular to the drawings. The cylinders and valves are to be lubricated by means of oilers of an approved pattern, placed in the cab with proper pipe connection to run under lagging of boiler to forward end, and to connect with top of steam-chest. Cylinders and valve chest-casings to be of sheet and cast iron, painted.

Valve Motion.—To be the most approved shifting link-motion, graduated to cut off equally at all points of the stroke. The links, slide-blocks, pins, lifters and eccentric-rod jaws to be made of the best hammered iron, and case-hardened. The valves to be of close-grained, hard cast iron, to have a travel of $5\frac{3}{4}$ inches at full link, and to have $\frac{7}{8}$ of an inch outside and $\frac{1}{16}$ of an inch inside lap, if a passenger engine, and $\frac{3}{4}$ of an inch outside and $\frac{1}{8}$ of an inch inside lap, if a freight engine. The face of the links is to be $2\frac{1}{2}$ in. The eccentrics are to be put on in two halves, keyed together in the usual way, and to be secured on the shaft by fluted steel keys, hardened, two keys to each eccentric, each key to have two set-screws.

Pumps.—To be two in number, one on each side of the engine, driven from lugs on the inside of the cross-heads. The right-hand pump is to have a plunger $2\frac{1}{4}$ in. diameter, and the left-hand pump to have a plunger 2 in. diameter. The pump-valves, branch pipes and boiler check-valves are to be made to correspond to the difference in the pump plungers; also the top and bottom air chambers are to be made of proportional size. The feed pipes from the pump back to the tank are to be of iron $2\frac{1}{2}$ in. inside diameter. The cock in the feed pipe on the right-hand side, is to have a lazy-cock-rigging attached, to be worked from the cab in reach of the engineer, both pumps to have pet-cocks arranged as usual, to be worked from the cab.

Driving Boxes.—To be fitted with cellars, caps, wedges, wedge-bolts and nuts, in exact conformity with the plans. Brasses to be at least $1\frac{1}{8}$ in. thick at the top, and to be made of pure ingot copper and tin in proportion as 7 to 1 and to be bored 7 in. in diameter, scraped and closely fitted to the journals.

Driving-Wheels.—To be four in number, of cast iron, centers of 57 in. diameter, with steel tires of 3 in. thickness on the tread, all turned to uniform size. The crank on the right-hand side is to be 90 degrees in advance of the crank on the left-hand side. The length of hub and diameter of holes are to conform accurately to the plan. The forward wheel is to have a counter-balance weight, diametrically opposed to the crank pin, which, reduced to the crank circle, shall be equal to the sum of the weights of the crank pin and its hub, the main rod, half of the side rod, the cross-head, piston and piston rod, less 75 lbs. The back wheel is to have a counter-balance weight diametrically opposed to the crank pin, which, reduced to the crank circle, shall be equal to the sum of the weights of the crank pin and its hub, and half of the side rod, plus 75 lbs.

Driving Axles.—To be of the best quality of hammered iron, $69\frac{1}{8}$ inches long over all; wheel seat to be $6\frac{7}{8}$ in. diameter; journal bearing and seat for eccentrics to be 7 in. diameter, turned and finished true; distance between face of driving-wheel hubs to be $53\frac{1}{2}$ in.

Trucks.—To be the 4-wheeled bogie, with wheels 28 in. diameter, and 68 in. spread, to have Chalender's Patent Center-Bearing, and to have a safety chain attached to the front bumper beam. To be made throughout in exact conformity with the plans of the C., B. & Q. Standard Truck.

Steam Pipes.—To be $4\frac{1}{2}$ in. inside diameter, with ball-joint connection to saddle, and crotch pipe. The dry pipe is to be of wrought iron, lap-welded, 6 in. outside diameter, with ball-jointed brass sleeves riveted on each end, well fitted and caulked, and connected to the front flue sheet and crotch pipe, and to the throttle pipe in the dome, as shown on the plan. The vertical end of the throttle pipe is to be provided with a balanced poppet throttle valve, to be operated by bell crank and throttle lever from the cab in the usual way.

Pilot.—To be of ash or oak, with horizontal bars well put together and ironed, and provided with a horned draw casting, all substantially as shown on the plan, and

well braced with a heel brace from the saddle, and set to clear the rail 9 in.

Cab.—To be of ash or oak; pine roof, covered with tin, substantially built and well finished; to be provided with a cab signal bell, seat boxes and a cab curtain, to let down while coaling.

Running Boards.—To be of cast iron, ½ inch thick, and flutes on top to give a safe foot-hold, and flanged on the outside. For passenger engines, the edges of the running boards are faced with a ¾-inch brass band, polished, and secured to the boiler shell by wrought-iron brackets of sufficient strength.

Carrying-Gear.—Equalizers to be of best hammered wrought iron, pivoted on a steel gib fitted into a wrought-iron strap attached to the frame. Driving springs to be made of 10 leaves of 3 in. × ⅝ in. steel, and to measure 34 in. from center to center of spring hangers. Expansion buckles to be made of 4½ in. × ⅞ in. wrought iron, planed and fitted accurately to the frames and secured to side of fire-box by four ⅞-in studs in each buckle, 2 above and 2 below the frame. Angle irons to be of cast iron, 1 in. thick, planed where they rest on the frame, and accurately fitted to the side of the fire-box, and secured by ⅞-in. studs. Liners are to be put behind the bottom expansion lugs, between frame and fire-box, leaving ½ in. play. No liners are wanted behind the wrought-iron expansion lugs, but four cast-iron corner brackets are to be put in, two forward and two back of fire-box, fitted closely around the corner of the box and up against, and level with the top of the frame; said brackets being secured to the fire-box by two ⅞-in. studs each.

Boiler Covering.—Lagging of 1¼ in. wood, neatly cased with Russia or Wood's Planished Iron, secured by iron bands if a freight engine, and brass bands if a passenger engine.

Boiler Trimmings.—Front end and door of cast iron, of a suitable pattern, with a number-plate of 17 in. outside diameter, fastened with 3 studs on the door, containing the number of the engine in 4-in. brass numbers; cast-iron lamp brackets, and lamp board; brass or iron hand rail, with brass acorns on forward end, bell of sufficient size, hung in a neat frame, and worked by a bell-cord on the fireman's side, and a West Patented Bell-Ringer on the engineer's side; said bell-ringer to be fastened to a wrought-iron angle-iron or bracket on the boiler, inside of the cab, in a convenient position. Sand box to be of sheet iron, painted, with cast-iron base and top, and to be operated by a rod and handle from the cab. Dome casing of sheet iron, painted, with cast-iron base and top; dome cover to contain two approved safety valves, and a whistle with rigging attached to work from the cab.

A glass water gauge and three 3-gauge cocks, with dripper to be provided for; also a reliable steam gauge, with proper connection and cock on boiler. Heater cocks, with connections to feed pipes; blower cock and pipe to front end; petticoat pipe of proper size, and to be adjustable; grates of standard C., B. & Q. pattern, consisting of 2 stationary, 1 drop and 2 rocking grates, to be operated from the cab. A Number 5 Friedman injector, or its equivalent, is to be provided, located on the left-hand side, with check on the boiler.

Engine Trimmings.—Wheel covers to be of ⅛-in. sheet iron, faced with 1-in. iron pipe, with brass drops at the ends; cylinder cocks to be of an approved pattern, with rigging attached, to be worked from the cab, as usual. Steps are to be provided on both sides, as well on the engine as on the tender, with handles on side of cab, and hand rails on the tank. Draw bar between engine and tender, to be of 1¼ × 3½ iron, with 2-in. coupling-pins. Heavy check chains are to be provided between engine and tender, attached to foot-board of engine and front sill of tank frame. The engine frames, at the extreme forward end, are connected across by a wrought-iron brace of 1 in. × 6 in. iron, on to which is bolted the oak bumper beam containing the horned casting for push-bar, and two cast-iron side brackets for pilot to bolt on to. The whole front end forward of saddle is provided with a sheet-iron covering ⅛ in. thick, and braced to smoke arch by 2 braces of 2 in. diameter in the usual manner. The water from tank is conducted to the feed pipe of the engine through a 2¼-in. 3-ply rubber hose, with C., B. & Q. standard brass hose coupling nut and sleeve to attach to goose-neck of tender, and brass cocks on end of feed pipes.

Pistons.—To be provided with Dunbar or any other equally good packing. Piston-rod to be of steel 2⅜ in. diameter, with a taper fit and shoulder in cross-head, secured with a steel key of ⅝ × 2½ in. piston to be put on with a nut on end of rod, and round taper pin through hub of spider.

Guides.—To be of steel 46½ in. long, 2¼ in. wide and 1⅝ in. thick in the middle, planed and finished all over, and secured to the back cylinder head, and to the guide yoke by guide blocks. Adjustable oil-cups of an approved pattern are to be provided on top of each of the guides.

Guide Yoke.—To be of wrought iron ⅞ in. thick, planed an slotted, and bolted to the frames and rocker-boxes, and also connected to the barrel of the boiler by a brace of sheet iron ¼ in. thick.

Cross-Heads.—To be of cast iron, wearing surface to be 15 in. long babbited; pin to be 2⅝ in. diameter, 2¼ long between shoulders. Cast-iron pump-lugs to be attached to the inside.

Tank.—To be substantially of the following dimensions:

	Ft.	In.
Total length	18	0
Total width	7	6
Length of water space	10	3
Length of water legs	8	3
Width of water legs	1	8
Height throughout	3	6

The top and bottom sheets throughout, and the inside of the water legs, are to be ¼ in. thick, all other sheets to be made of ⅜-in. iron. All sheets are to be of uniform finish and thickness, free from pits and scales, and a sample is to bend at right angles, cold, without showing any crack or flaw. All sheets are to be well riveted, with ⅞-in. rivets, spaced not over 1½ in. apart, between centers; sides and top to be stiffened with 2½ × 2½ T iron, connected with flat iron braces.

Tank Truck.—To be the Thielsen Patent Channel-Bar Truck, with 33-in. wheels, and to have the C., B. & Q. Standard Axle.

Tank Frame.—To be made of oak, with wrought-iron transom, to conform closely to the detail drawings of same; to be well put together, and provided with draw castings; chafe-irons and safety chains and hooks to connect with chain and hook from engine foot-board, and, if a passenger engine, safety chains to connect with coaches. The coal space has a 1-in. oak floor laid on top of the pine floor, covering the whole frame, and on said oak floor a sheet of iron, 90 in. wide and 5 ft. long, is laid down with countersunk screws to shovel coal on. Brake shaft to be of 1¼-in. iron, located in the coal space, on the left-hand side, 9 in. back from the extreme forward end of water leg, and 2 in. out from the sheet; shaft to be encased in an iron pipe let into the floor and riveted into a wrought-iron bracket on top of the water leg, ratchet and pawl, to be located on top of tank; brake to be put on back truck only. The tank body is to be secured to the frame by six wrought-iron lugs, riveted on, 2 each at the extreme back and forward ends and 2 in the end of the coal space, ⅞-in. bolts passing down through lug and frames.

Rods.—Main and parallel rods to be made of the best quality of a suitable iron, furnished with all necessary straps, bolts, keys and brasses, all closely fitted. Brasses to be of best ingot copper and tin, with strips of babbited metal, as shown on detailed drawings, and accurately fitted to wrist-pins. Adjustable oil-cups are to be provided on both ends of side rods and back end of main rod.

CONCLUSION.—The locomotive is to be furnished with a complete complement of tools as per list attached and with tool boxes on the tank and in the cab, made to plans furnished; also with a head light with a 22-in. reflector, and Davis's Patent Burner; also, if for passenger service, with a Westinghouse air pump and brake attached under tender, with all the necessary pipe and hose connections complete. The locomotive is to be built and equipped throughout in a first-class manner. All principal parts to be interchangeable, and accurately fitted to gauges and templates. All threads and bolts to be made to C., B. & Q. standard; and gauges to be furnished. Exact conformity with the plans, which will be furnished in the necessary details, will be insisted on in case of all details where specific mention to that effect is made in the foregoing, unless an agreement to the contrary is made in each case.

Engine and tender to be painted and varnished in accordance with specification.

SPECIFICATIONS OF DETAILS AS PER NUMBERS IN TABLE.

1. *Fire-Box*, will include the box finished on floor, also driving rivets in bottom of box, also fire-box ring and fire-box door, and all material for same.

2. *Boiler Shell*, will include the shell finished with smoke arch on, with smoke stack hole cut, the dome, the dome ring and dome cover on, and all material for same.

3. *Stay-Bolts*, will include making, cutting, putting in, tapping out holes, and caulking, with all material for same.

4. *Crown Bars*, will include making and putting on, also all braces inside of boiler, and all material for same.

5. *Flues* will include flues and putting them in, and all material for same.

6. *Smoke-Stack*, will include the stack finished, and all material for same, including base.

7. *Ash Pan*, will include the ash pan finished and on, with all rods and dampers complete, and all material for same.

8. *Frames*, will include frames finished and all ready to put up, also pedestal braces, and all material for same.

9. *Foot Board*, will include foot-board and cab-seat supports, and side plates and chafe-iron fitted complete and all ready to go up, and all material for same.

10. *Cylinder Saddle*, will include all work on saddle complete till ready to put up, and all material for same.

11. *Cylinders*, will include the cylinders, steam-chests, cylinder-heads, with their casings, and lagging and jacket finished complete, all ready to put on, cylinder cocks, tallow cups and glands included, and all material for same.

12. *Valve Motion*, will include valves, yokes, rods, rocker-arms and boxes, links, lifters, tumbling-shaft, arms and boxes, reach-rod, reverse lever, quadrant, counter-balance spring, and casings, eccentrics, eccentric straps and eccentric rods all finished complete and ready to put up, and all material for same.

13. *Pumps*, will include pumps, plungers, air chambers, valves, feed pipes, check pipe, checks and casings, lazy cocks, jet cocks and bottom hose, nuts, fitted complete and all ready to set up, with all material for same.

14. *Driving Boxes*, will include the boxes, cellars, caps and wedges, wedge bolts and nuts, all fitted complete, ready to go up, with all material for same.

15. *Driving Wheels*, will include wheels, axles, tires, crank pins, fitted complete, ready for use, with all material for same.

16. *Trucks*, will include truck complete, center-pin and stay chains, fitted complete, with all material for same.

17. *Steam Pipes*, will include steam, exhaust, dry, throttle and crotch pipes, with throttle valve, and ring on front flue sheet, with rods, levers and pins for working throttle valve, including stuffing box and gland and throttle lever all fitted complete, with all material for same.

18. *Pilot*, will include draw-bar casting, draw bar, all braces, finished and put on, and all material for same.

19. *Cab*, will include cab finished and fastened on permanently, and all material for same.

20. *Running Boards*, will include boards finished, with all braces and material for same.

21. *Carrying-Gear*, will include driving springs, hangers, equalizers and hangers, expansion lugs and angle irons, with all material for same.

22. *Boiler Covering*, will include lagging and jacketing boiler and dome.

23. *Boiler Trimmings*, will include front end and door, lamp brackets and number plate, lamp board and column, hand rail, bell and frame, bell ringer, sand box, dome casings, safety valve, whistle, water gauge, gauge cocks, steam gauge, heater-cocks and pipes, flag staffs, blow-off cocks, petticoat pipe, blower cock and pipe, grates and levers and injectors.

24. *Engine Trimmings*, will include wheel covers, cylinder-cock rigging, name plate, lazy-cock rigging, engine steps, draw bar, engine check chains, brace across frame that bumper beam bolts to, bumper and covering for same, smoke-arch braces, braces from boiler to frame, hose, wooden deck, head lights, cab bell, etc.

25. *Pistons*, will include all work on pistons, including key way and key, fitting in cross-head, packing and head finished complete, ready to put in, and all material for same.

26. *Guides*, will include guides, guide blocks finished ready to put up, and all material for same.

27. *Guide Yoke*, will include guide yoke finished ready to put up, and all material for same.

28. *Cross-Head*, will include them finished ready to put up, and all material for same, including pump lug attached.

29. *Tanks*, will include tank finished complete, all work above the frame charged to tank, and all material for same.

30. *Tank Trucks*, will include trucks complete, with male and female center-pins, check chains, and all material for same.

31. *Tank Frames*, will include draw-bar castings back and forward, and all work above the trucks and below the tank, including top hose nuts.

32. *Rods*, will include main and parallel rods finished complete ready to put on, and all material for same.

33. *Erecting*, will include labor only of putting up finished work.

34. *Bolts*, will include the forging, turning and threading of all bolts and nuts, except stay-bolts, used, regardless of what specification they belong to, and all material for same.

35. *Air Brake*, will include the Westinghouse Air Brake put on, and all material for same.

36. *Tools*, will include a full outfit of tools and tool boxes on the tank and in the cab.

THE Union Pacific car shops at Omaha, Neb., are building baggage, mail and way cars. The mail cars are 61 feet long and are fitted up with the best appliances for the mail service. At one end are berths for messengers. The ventilation is at the sides only, and there are no end doors for communication with the rest of the train—a precaution against train robbers. The roofs are smooth and uniform, with no openings except for stove pipes at each end. The windows in the sliding side doors are large and on a line with the others. There are nine of these cars under construction, all of which have Miller platforms and air-brakes. Eight are required to do the mail business of the line, the ninth being intended as an extra. The wheels made at these shops have a ⅝ chill, and are turned off by the Lobdell method, making a mileage of 90,000 miles and extending the life of the cars.

THE Atchison, Topeka & Santa Fe locomotive and car shops, at Topeka, Kan., are well equipped with machinery, tools and other necessary facilities, including a steam-hammer for making scrap axles. The Superintendent of Machinery, Mr. Geo. Hackney, was formerly master mechanic of the Milwaukee Iron Co.'s mills, and the Purchasing Agent, Mr. F. M. Smith, is from the C., B. & Q. road. Manager Strong's special car is a marvel of convenience and thorough construction; it has a central sleeping apartment, kitchen, dining-room, and two end saloons arranged so as to command an unobstructed view of the track. An auxiliary car is used in connection with it. It is forty feet long, has four sleeping sections in the Pullman style, a baggage compartment, and runs on four 42-inch wheel trucks. The shops are now building and rebuilding flat, coal and combination cars, averaging in all about 25 per month.

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CELEBRATED PLUMBAGO OILS.

The only Oils which will hold Plumbago in absolute suspension in any climate and for any length of time.

Hot Journals made impossible by their use, and wear of brasses reduced to minimum. Cutting of Valve-Seats and Cylinders avoided.

The Cheapest and Only Perfect Lubricators known for Railroad Car Journals, Heavy Bearings, Fast-Running Machinery, Cylinders, etc.

These Oils have been thoroughly tested in comparison with a number of the best known lubricants, by **Prof. R. H. Thurston,** in charge of the Department of Engineering, Steven's Institute of Technology, Hoboken, N. J. Prof. Thurston reports that, gallon for gallon, **French's Plumbago Oil,** for railroad service,

Is worth 4.82 times as much as Sperm Oil.
" 12.33 " " Lard Oil.
" 9.25 " " W. Va. Oil.
" 15.51 " " **Ordinary Reduced Black Oil.**

With the further advantage to our Plumbago Oils of little tendency to gum, and **entire freeness from Acid.**

EXTRACT FROM REPORT OF PROF. THURSTON.

* * * * * * *

THE "FRENCH'S PLUMBAGO OILS" *thus appear to possess those much-sought-for qualifications which are practically necessary to the complete realization of the great advantages in lubricating and cooling, possessed by Plumbago as a lubricant.* Very respectfully, R. H. THURSTON.

The following are a few out of hundreds of practical tests with our oils:

H. WALKEYS, SUPT. MOTIVE POWER, N. Y. C. & H. R. R., Western Division, RAN THE TENDER OF ENGINE 180 (FAST PASSENGER) THREE AND A HALF MONTHS, 150 miles per day, or ABOUT 15,000 MILES, WITH ONE OILING WITH OUR PLUMBAGO COACH OIL, and states that it would have run longer, but engine was stopped to put under new wheels.

PASSENGER CAR 130 ON THE N. Y. C. & H. R. R. RAN 33,040 MILES WITH ONLY ONE OILING WITH OUR PLUMBAGO COACH OIL, AND NO OTHER OIL USED.

WAGNER SLEEPING-CAR NO. 40 ON SAME ROAD, RAN 15,000 MILES WITH ONLY ONE OILING OF SAME, AND NO OTHER OIL USED.

WAGNER DRAWING-ROOM CARS "CITY OF ROME" AND "CATSKILL" RAN ON N. Y. C. & H. R. R. EACH 10,000 MILES WITH ONE OILING.

N. E. CHAPMAN, MASTER MACHINIST, CLEVE. & PITTS. R. R., CERTIFIES THAT HE RAN COACH NO. 37 ON THAT ROAD 33,470 MILES WITH ONE OILING OF OUR COACH OIL.

W. F. TURREFF, MASTER MECHANIC, CLEVE., TUSCARAWAS VALLEY & WHEELING R. R., CERTIFIES THAT COACH NO. 8 RAN ON THAT ROAD 24,400 MILES WITH ONE OILING OF OUR PLUMBAGO COACH OIL.

Henry Jones, Engineer, certifies that our Plumbago Cylinder Oil lasts twice as long for Cylinder use as Sperm Oil, and that with *HALF THE PRESSURE OF STEAM HE GETS THE SAME POWER AS WHEN LUBRICATING WITH SPERM OIL.* He states that his cylinder and valve-seats are in better condition than when new, three years ago, and cylinder "polished like a mirror."

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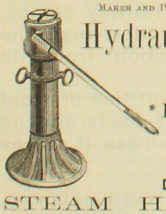

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Particular attention is called to the "AUTOMATIC" and "LOCOMOTIVE DRIVER BRAKES," now being tested and adopted by the prominent lines.

With the "DRIVER BRAKE" the engineer can handle an ordinary freight train better than with brakemen. The saving in car wheels and wages will therefore be apparent. On shifting or yard engines it is invaluable.

The "AUTOMATIC" has proved itself to be the most efficient train and safety brake known. Its application is instantaneous; it can be operated from any car in the train, if desired, and should the train separate, or a hose or pipe fail, it applies automatically. A GUARANTEE is given customers against loss from PATENT SUITS on the apparatus sold them.

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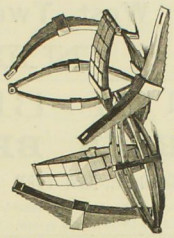

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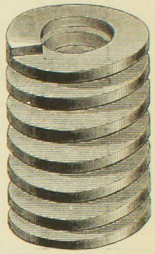

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ONE	Second-hand Wheel Press.	" 200

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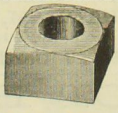

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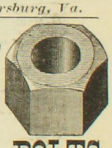

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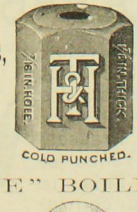

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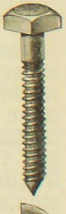

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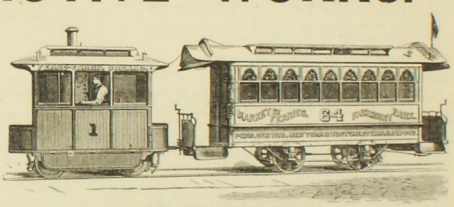

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At and near frogs and switches, and where a guard-rail lies within the track, this gauge is particularly convenient and useful, as the lugs at each end project down so far that the implement stands clear of any intervening obstacles. At such points and on curves, where an accurate gauge of the rails is most difficult to be secured, and at the same time most desirable for economy in operating the road, this gauge saves the time of section-men, and in one respect, at least, secures good work from them.

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Wherever it has been used, the road-masters and section foremen indorse it heartily. The following are some of the companies which have adopted it, and, as the excellence of the permanent way of these roads is well known, their practical indorsement is worthy of note:

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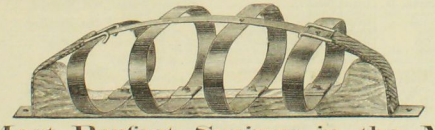

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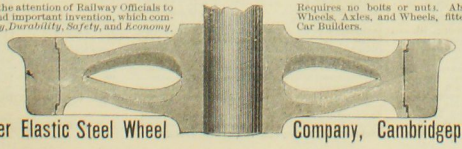
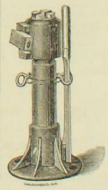


The Cooper Elastic Steel Wheel Company, Cambridgeport, Mass.



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Salt Lake Division	W. H. McKenzie		Terrace, Utah.
Salt Lake Division		G. J. Turner	Ogden, Utah.
Central Vermont	J. M. Foss		St. Albans, Vt.
New London & Northern Div.	J. W. Dow	J. W. Dow	New London, Conn.
Rutland Division	N. L. Davis	N. L. Davis	Rutland, Vt.
Chesapeake & Ohio	§John McFarland	J. N. King	Richmond, Va.
Chesapeake & Ohio	Tho. L. Chapman	H. C. Bassinger	Huntingdon, W. Va.
Chesapeake & Ohio	Jas. Devine		Staunton, Va.
Cheraw & Darlington	John Bissett	W. H. Day	Florence, S. C.
Cheshire	F. A. Perry	A. E. Howard	Keene, N. H.
Charlotte, Columbia & Augusta		J. C. Troeger	Columbia, S. C.
Chicago & Pacific	James Penny	C. N. Code	Chicago, Ill.
Chicago & Northwestern	**Geo. W. Tilton	††William Campbell	Chicago, Ill.
Wis., Mad. & Mill. Divis.			Chicago, Ill.
Galena Division			Chicago, Ill.
Iowa Division	J. O. Chapman	H. L. Preston	Clinton, Ia.
Peninsula Division	Geo. White		Escanaba, Mich.
Chicago & Alton	§§A. A. Ackerly		Bloomington, Ill.
Chicago, Burlington & Quincy	§§Geo. Chalender	Geo. Chalender	Aurora, Ill.
Chicago, Burlington & Quincy	H. B. Stone	*J. Christiansen	Aurora, Ill.
Galesburg Division	Robert Colville		Galesburg, Ill.
Iowa Division	Joel West		Burlington, Ia.
Iowa Division	C. W. Eckerson		Creston, Ia.
Chicago & Springfield	W. B. McKenna		Clinton, Ill.
Chicago, Clinton, Dubuque & Minn.	E. Smedley	E. Smedley	Dubuque, Ia.
Chicago, Rock Island & Pacific	T. B. Twombly	B. K. Verbryck	Chicago, Ill.
Southwestern Division	R. O. Carscadin		Trenton, Mo.
Chicago & Michigan Lake Shore	Russell Booth		Muskegon, Mich.
Chicago & Eastern Illinois	Allen Cooke	Allen Cooke	Danville, Ill.
Chicago & Iowa	H. S. Bryan		Aurora, Ill.
Chicago, Milwaukee & St. Paul	J. M. Lowry		Milwaukee, Wis.
La Crosse & P. Du. Ch. Div		John Ballie	Milwaukee, Wis.
Northern Division			Milwaukee, Wis.
Iowa & Minn. Division	J. O. Pattie		Wm. E. Kittredge	Milwaukee, Wis.
Hastings & Dakota Div	C. C. Clements		J. A. Gilbert	Minneapolis, Minn.
Chicago & Paducah	T. J. Grosch			Hastings, Minn.
Chicago, Pekin & Southwestern		T. J. Grosch		Streator, Ill.
Chicago, St. Louis & New Orleans	**W. H. Purdy	A. S. Jackson		Streator, Ill.
Chicago, St. Louis & New Orleans	E. B. Anderson	M. M. Martin		McComb City, Miss.
Chicago, St. Louis & New Orleans	J. M. Keith			McComb City, Miss.
Chicago, St. Louis & New Orleans	J. F. White			Jackson, Tenn.
Chicago, Pekin & Southwestern	A. R. Overton			Water Valley, Miss.
Chicago, St. Paul & Minneapolis	Matt Ellis	J. C. Fischer		Joliet, Ill.
Cincinnati, Wabash & Michigan	S. B. Tinker	S. B. Tinker		Hudson, Wis.
Cincinnati, Hamilton & Dayton	James Eckford	W. H. H. Allison		Wabash, Ind.
Indianapolis Division	Edward Moore			Cincinnati, O.
Cincinnati, Lafayette & Chicago	J. B. Morgan	J. B. Morgan		Indianapolis, Ind.
Cincinnati & Muskingum Valley	Leroy Kells	Daniel Jewell		Lafayette, Ind.
Cincinnati, Richmond & Chicago	Wesley S. Brewer			Zanesville, O.
Cincinnati, Sandusky & Cleveland	B. J. Gregg			Richmond, Ind.
Cincinnati Southern	Tho. Price	Geo. Butler		Sandusky, O.
Cleve., Col., Cin. & Indianapolis	‡L. S. Young	††L. S. Young		Cincinnati, O.
Indianapolis Division	A. R. McAlpine	R. Attridge		Cleveland, O.
Cincinnati Division	Israel W. Fowle			Brightwood, Ind
Columbus Division	F. G. Kaufholz	Wm. Cleave		Delaware, O.
Cleveland & Pittsburgh	N. E. Chapman	A. Steinbrunner		Cleveland, O.
Cleve., Mt. Vernon & Columbus	J. W. Holloway	J. W. Holloway		Cleveland, O.
Cleve., Tusc. Valley & Wheeling	W. F. Turreff	Geo. H. Pratt		Akron, O.
Cobourg, Peterboro & Marmosa	Wm. Polson			Black River, O.
Columbus & Hocking Valley	I. G. Hutchins	J. M. Rockafield		Columbus, O.
Concord	J. T. Gordon	J. T. Gordon		Columbus, O.
Concord & Portsmouth	J. T. Gordon	J. T. Gordon		Concord, N. H.
Concord & Claremont	**J. N. Lander			Concord, N. H.
Connecticut River	§Wm. H. Stearns	R. Hitchcock		Concord, N. H.
Connecticut Valley	S. E. Brewer	S. E. Brewer		Springfield, Mass.
Connecticut Western	John C. Barton			Hartford, Conn.
Conn. & Passumpsic Rivers	John R. Hubbard			Hartford, Conn.
Corning, Cowanesque & Antrim	G. C. Patchell	G. C. Patchell		Lyndonville, Vt.
Cumberland Valley	A. S. Hull	G. W. Nitterbouse		Corning, N. Y.
Cumberland & Pennsylvania	J. F. Van Horne	Nathan Binnix		Chambersburg, Pa.
				Mt. Savage, Md.
D				
Dak. So. & Sioux City & Pembina	J. H. Moulton	J. H. Moulton		Yankton, Dak.
Danbury & Norwalk	N. M. George	N. M. George		Danbury, Conn.
Danville & Southwestern	B. L. Baldwin			Danville, Ill.
Davenport & Northwestern	H. E. Woods			Davenport, Ia.
Dayton & Union	H. S. Gordon	H. S. Gordon		Dayton, O.
Dayton & Southeastern	Wm. E. Cooper			Dayton, O.
Dayton & Michigan	John Black	W. H. H. Allison		Cincinnati, O.
Delaware, Lackawanna & West.	Walter Dawson	Robert McKenna		Scranton, Pa.
Morris & Essex Division	W. H. Lewis			Kingsland, N. J.
Morris & Essex Division		J. W. Baker		Dover, N. J.
Oswego & Syracuse Division	James Buchanan			Syracuse, N. Y.
Utica, Chenango & Susq. Div.	Tho. Thatcher			Utica, N. Y.
Bloomsburg Division	Charles Graham			Kingston, Pa.
Delaware & Hudson Canal Co	R. C. Blackall			Albany, N. Y.
Delaware & Chesapeake	Jos. A. Baynard			Easton, Md.
Delaware & Hudson Canal Co		T. Orchard		Carbondale, Pa.
Rensselaer & Saratoga Div.	J. L. Corey	John Wicks		Green Island, N. Y.
Denver Pacific	§R. McDougall	John Clock		Denver, Col.
Denver & Rio Grande	N. W. Sample	N. W. Sample		Denver, Col.
Denver, South Park & Pacific	James Kirk	James Kirk		Denver, Col.
Des Moines & Fort Dodge	John McGrail	R. Merrill		Grand Junction, Ia.
Detroit, Grand Haven & Mil	Fred Parker			Detroit, Mich.
Detroit, Lansing & Northern	G. C. Watrous	G. C. Watrous		Ionia, Mich.
Dorchester & Delaware				Cambridge, Md.
Dunkirk, Allegheny Val. & Pitts.	J. C. Haggett	J. C. Haggett		Dunkirk, N. Y.
E				
East Broad Top	Wm. C. Maynes			Orbisonia, Pa.
Eastern				East Boston, Mass.
Eastern Kentucky	D. L. Weaver	D. L. Weaver		Hunnewell, Ky.
E. Tennessee, Virginia & Georgia	C. A. Hodge	Joseph Armbruster		Knoxville, Tenn.
Erie & Pittsburgh	J. N. Wood	J. N. Wood		Erie, Pa.
Eureka & Palisade	S. Alson			Eureka, Nev.
European & North Am. (of Maine)	A. O. Bailey	A. O. Bailey		Mattawamkeag, M.
Evansville & Terre Haute	John L. White	Joseph Stiker		Evansville, Ind.
Evansville, Terre Haute & Chic.	§§W. D. Macfarlane			Terre Haute, Ind.
F				
Fitchburg	Geo. A. Cooledge	Enos Varney		Charlestown, Mass.
Vermont & Mass. Div	W. A. Foster	Jacob Marsh		Fitchburg, Mass.
Flint & Pere Marquette	T. J. Hatswell	R. B. More		E. Saginaw, Mich.
Florida Central	James S. McElroy	James S. McElroy		Jacksonville, Fla.
Flushing, North Shore & Central	Thomas Meehan	Edward Riley		L. I. City, N. Y.
Fort Wayne, Jackson & Saginaw	C. W. Hollister			Jackson, Mich.
Fort Wayne, Muncie & Cincinnati	Wm. McPhail	Wm. McPhail		Fort Wayne, Ind.
Freehold & New York				Freehold, N. J.
G				
Galena & Wisconsin	Jacob Eiseman	J. M. Ivey		Galena, Ill.
Galv., Harrisburg & San Antonio	D. T. Davis			Harrisburg, Tex.
Galveston, Houston & Henderson	G. Conlon			Galveston, Tex.
Geneva, Ithaca & Sayre	J. N. Weaver			Waverly, N. Y.
Georgia		E. R. Brown		Packerton, Pa.
Grand Haven	H. Bettinghouse	T. M. Preval		Augusta, Ga.
Grand Tower & Carbondale	Hugh Smith	Hugh Smith		Muskegon, Mich.
Grand Trunk	‖Herbert Wallis	Wm. McWood		Grand Tower, Ill.
Grand Trunk	Warren Noyes			Montreal, Canada.
Grand Trunk		Duncan Menish		Gorham, N. H.
Grand Rapids & Indiana	J. M. Boon			Portland, Me.
Grand Rapids & Indiana	J. R. Fish	J. R. Fish		Fort Wayne, Ind.
Grayville & Mattoon	C. H. Cory			Grand Rapids, Mich.
Great We tern, of Canada	‖C. K. Domville			Waterloo, Ill.
Great Western, of Canada	C. F. Hanson	Henry Childs		Hamilton, Can.
Green Bay & Minnesota	Edw. Osborne			London, Ont.
Greenville & Columbia	R. H. Anderson	R. H. Anderson		Green Bay, Wis.
				Helena, S. C.
H				
Hanover Junction & Gettysburg	John J. Bingley	Henry Britcher		Hanover, Pa.
Hannibal & St. Joseph	§§Tho. G. Gorman			Hannibal, Mo.
Hartford, Providence & Fishkill	Amos Pillsbury			Hartford, Conn.
Housatonic	N. Slingland	J. J. Ferris		Falls Village, Conn.
Houston, East & West Texas	J. E. Wiggin			Houston, Tex.
Houston & Texas Central	L. C. Noble	James McGee		Houston, Tex.
Huntingdon & Broad Top	Wm. Barkla			Saxton, Pa.
I				
Illinois Central	**S. J. Hayes	W. B. Snow		Chicago, Ill.
Chicago Division	Henry Schlacks			Chicago, Ill.
South Division	David Oxley			Centralia, Ind.
North Division	J. B. Edams			Amboy, Ill.
Iowa Division	Thomas W. Place			Clinton, Ill.
Springfield Division	W. B. McKenna			Paris, Ill.
Illinois Midland	J. G. Clifford			Belleville, Ill.
Illinois & St. Louis	J. H. Smith			E. St. Louis, Ill.
Illinois & St. Louis		Charles Rothe		Cincinnati, O.
Indianapolis, Cin. & Lafayette	J. S. Patterson	J. S. Patterson		Indianapolis, Ind.
Indianapolis, Decatur & Springfield	Pulaski Leeds			Peru, Ind.
Indianapolis, Peru & Chicago	John McKenna	John McKenna		Mattoon, Ill.
Indianapolis & St. Louis	A. J. Sanborn	A. J. Sanborn		Urbana, Ill.
Indiana, Bloomington & Western	C. A. Thompson	H. Ford		Palestine, Tex.
International & Great Northern	R. B. Small	W. H. Martin		Moncton, N. B.
Intercolonial	H. A. Whitney	Edw. Shaffer		Ironton, O.
Iron	Perry Scott	Chem. Roetling		
J				
Jacksonville, Pensacola & Mobile	John P. Laird			Tallahassee, Fla.
Jeffersonville, Mad. & Indianapolis	Wm. Swansten	J. D. McIlwain		Jeffersonville, Ind.
Jacksonville, N. West. & S. East.	B. J. Miller			Jacksonville, Ill.

Railroad.	*Master-Mechanic.*	*Master Car-Builder.*	*Residence.*
Joplin	P. T. Butterly	P. T. Butterly	Girard, Kan.
Junction & Breakwater	J. A. Maguire		Lewes, Del.
K			
Kansas City, Fort Scott & Gulf	J. S. McCrum	A. N. Montier	Kansas City, Mo.
Kansas City, Lawrence & South'n	J. S. McCrum		Kansas City, Mo.
Kansas City & Eastern	J. H. Burnham	J. H. Burnham	Independence, Mo.
Kan. City, St. Jo. & Coun. Bluff	Wm. D. Rowley	Theo. Aylesbury	St. Joseph, Mo.
Kansas Central	Wm. McCall		Leavenworth, Kan.
Kansas Pacific	**John MacKenzie	T. B. Roberts	Armstrong, Kan.
Kaw Valley Division	James Long		Armstrong, Kan.
Smoky Hill Division	John B. Daily		Ellis, Kan.
Denver Division	R. McDougal	John Clock	Denver, Col.
Kentucky Central	J. R. Ledyard	J. L. Hackathorn	Covington, Ky.
Keokuk & Des Moines	S. W. Wakefield	S. W. Wakefield	Keokuk, Iowa.
Knox & Lincoln	E. Bolton	C. L. Turner	Bath, Me.
L			
Lafayette, Bloom. & Muncie	C. E. Gore	C. E. Gore	Lafayette, Ind.
Lake Erie & Western	E. Clemons		Fremont, Ohio.
Lake Shore & Michigan Southern	‡James Sedgley	††John Kirby	Cleveland, Ohio.
Michigan Southern Division	Geo. W. Stevens		Elkhart, Ind.
" " "		Frank O. Bray	Adrian, Mich.
Toledo Division	J. M. Sanborn	W. O. Smith	Norwalk, Ohio.
Erie Division	L. O. Gassett	J. Withyecombe	Cleveland, Ohio.
Buffalo Division	Edward Studley	A. C. Robson	Buffalo, N. Y.
Lehigh Valley	John I. Kinsey		South Easton, Pa.
Lehigh Valley	P. Hofecker		Weatherly, Pa.
Lehigh Valley	John Campbell		Delano, Pa.
Lehigh Valley	D. Clark		Hazleton, Pa.
Lehigh Valley	J. N. Weaver	A. Strauss	Waverly, N. Y.
Lehigh Valley		E. R. Brown	Mauch Chunk, Pa.
Little Rock & Fort Smith	James Eblin	James Malone	Argenta, Ark.
Little Rock, Miss. River & Texas	Joseph Taylor		Arkans's City, Ark.
Los Angeles Independence	Jas. Velsir	J. S. Young	Los Angeles, Cal.
Louisville, New Albany & Chicago	Geo. Ruhlandt	Geo. Helfrich	New Albany, Ind.
Long Island	§Thos. Meehan	Hugh Longest	L. Isl'd City, N. Y.
Louisville, Cincinnati & Lexing'n	A. Schaeffer	A. Schaeffer	Louisville, Ky.
Louisville & Nashville	**Reuben Wells		Louisville, Ky.
Louisville Division	D. P. Rennie		Louisville, Ky.
Nashville & Decatur Div	W. J. Steele		Nashville, Tenn.
South & North Ala. Div	C. W. White		Birmingham, Ala.
Memphis & Ohio Div	Thos. Walsh		Memphis, Tenn.
Clarksville Division	Wm. Adair		Bowling Green, Ky.
Ev., Hen. & Nashville Div	E. M. Humstone		Edgefield, Tenn.
Lowell & Nashua	S. A. Davis	S. A. Davis	Nashua, N. H.
M			
Macon & Brunswick	R. Wagnon	R. Wagnon	Macon, Ga.
Maine Central	J. W. Philbrick	J. W. Philbrick	Waterville, Me.
Maine Central		C. H. Kenison	Augusta, Me.
Manchester & Lawrence	J. T. Gordon	J. T. Gordon	Concord, N. H.
Manhattan Elevated	Allen Sterling		New York, N. Y.
Marietta, Pittsburg & Cleveland	Thos. Robertson		Marietta, Ohio.
Marietta & Cincinnati	E. M. Bosley	E. M. Bosley	Chillicothe, Ohio.
Marquette, Houghton & Onton'gn	W. H. Williams	H. D. Lyons	Marquette, Mich.
Memphis, Paducah & Northern	G. M. Taylor	G. M. Taylor	Paducah, Ky.
Memphis & Little Rock	Tho. Rennell	P. Twitchell	Argenta, Ark.
Memphis & Charleston	§H. N. Burford	J. J. Casey	Memphis, Tenn.
Michigan Central	S. H. Edgerly		Jackson, Mich.
Michigan Central		††Robert Miller	Detroit, Mich.
Milwaukee, Lake Shore & West'n	S. Chairnly		Manitowoc, Wis.
Minneapolis & St. Louis	Tho. Downing	Tho. Downing	Minneapolis, Minn.
Mineral Point	Robert Hay	Robert Hay	Mineral Pt., Wis.
Mineral Range	George F. Coon		Hancock, Mich.
Mississippi & Tennessee	Geo. Haszinger	S. J. Bolton	Memphis, Tenn.
Missouri & Western	A. C. Persing		Pierce City, Mo.
Missouri, Iowa & Nebraska	J. G. Crozier		Alexandria, Mo.
Missouri, Kansas & Texas	H. H. Alexander		Dennison, Texas.
Missouri, Kansas & Texas	**G. W. Cushing	John C. Barber	Sedalia, Mo.
Missouri, Kansas & Texas	Wm. T. Small		Parsons, Kan.
Missouri Pacific	§§John Hewitt	John Hodge	St. Louis, Mo.
Missouri Pacific	R. D. Grant		St. Louis, Mo.
Missouri Pacific	Geo. W. Walshe		Sedalia, Mo.
Mobile & Montgomery	W. H. Thomas	Lewis Barham	Montgomery, Ala.
Mobile & Girard	J. C. Albrecht	A. J. Nix	Columbus, Ga.
Mobile & Ohio	R. H. Briggs	J. T. Booth	Whistler, Ala.
Mobile & Ohio	John Fitzgerald		Macon, Miss.
Mobile & Ohio	M. T. Carson		Jackson, Tenn.
Montgomery & Eufaula	D. M. Gugel	James A. Knight	Macon, Ga.
Morgan's Louisiana & Texas	N. Tilton	Wm. O'Brien	Algiers, La.
N			
Nashville, Chattan'ga & St. Louis	James Cullen	J. G. Sawyer	Nashville, Tenn.
Naugatuck	Henry Hanford	George W. Gray	Bridgeport, Ct.
Nebraska	D. Hawksworth		Plattsmouth, Neb.
Newbu g, Dutchess & Connecticut	W. G. Vanbuskirk		Dutchess J'n, N. Y.
New Brunswick	P. A. Logan	T. N. Burper	Fredericton, N. B.
New Brunswick & Canada	Tho. Armstrong	G. Houlton	St. Andrew's, N. B.
New Haven & Northampton	Henry Fox	John Sweeny	New Haven, Ct.
New Jersey Midland	W. C. Ennis		Wortendyke, N. J.
New Jersey & New York	J. S. Drake		Jersey City, N. J.
New Jersey Southern	Rufus Blodgett		Manchester, N. J.
New Orleans & Mobile	§Josiah Bettis		Mobile, Ala.
New York, Lake Erie & Western	V. Blackburn		Susquehanna, Pa.
New York, Lake Erie & Western	J. H. Vreeland		Jersey City, N. J.
New York, Lake Erie & Western	F. M. Wilder	M. Wilder	Buffalo, N. Y.
New York, Lake Erie & Western	George H. Griggs		Hornellsville, N. Y.
New York, Lake Erie & Western		D. B Goodell	Elmira, N. Y.
New York, Lake Erie & Western		J. N. Mileham	Jersey City, N. J.
New York, Lake Erie & Western	J. Van Vechten	J. Van Vechten	Port Jervis, N. Y.
New York, Lake Erie & Western	Jos. Bradt		Rochester, N. Y.
New York & Harlem	§§Wm. M. Strong		New York.
New York & Harlem		C. E. Garey	Morrisania, N. Y.
New York Central & Hud. River		††Leander Garey	New York.
New York Central Division	§§G. B. Van Vorst	D. Hoit	West Albany, N. Y.
New York Central Division	§§Henry Watkeys		Syracuse, N. Y.
New York Central Division	§§Amos Gould	Wm. Johnson	Buffalo, N. Y.
New York Central Division	§§S. L. White	Richard Donaby	Niagara F'ls, N. Y.
New York Central Division		E. A. Olmstead	E. Buffalo, N. Y.
Hudson River Division	§§Wm. Buchanan		New York City.
New York Central Division		W. B. White	E. Rochester, N. Y.
New York Central Division		John House	Rochester, N. Y.
New York & Oswego Midland	Edw. Minshull		Middletown, N. Y.
New York & New England	Geo. E. Boyden	Elias E. Pratt	Boston, Mass.
Norwich & Worcester Div	Richard Colburn	John W. Marden	Norwich, Ct.
New York, N. Haven & Hartford	§§H. Kettendorf	James Denver	New Haven, Ct.
Hartford Division	§§Jon. Henney, Jr.	L. Packard	Hartford, Ct.
New York & Manhattan Beach	Lewis James		Bay Ridge, L. I.
Northern Central	§§R. H. Soule	G. W. Demarest	Baltimore, Md.
Northern Central	J. M. Coale		Baltimore, Md.
Northern Central	James Strode	J. C. Dyott	Elmira, N. Y.
Northern New Hampshire	**Jas. N. Lauder		Concord, N. H.
Northern of Canada	Peter Clark	Peter Clark	Toronto, Can.
Northern Pacific			Brainerd, Minn.
Minnesota & Dakota Div	A. P. Farrar		Brainerd, Minn.
Pacific Division			Kalama, W. T.
North Pennsylvania	Chas. Norton	C. W. Hammann	Philadelphia, Pa.
Northeastern		W. H. Day	Florence, S. C.
North Pacific Coast	James Walch		Saucelito, Cal.
Northwestern & Grand Trunk	G. W. Prescott		Battle Creek, Mich.
O			
Ogdensburg & Lake Champlain	Abraham Klohs		Malone, N. Y.
Ohio & Mississippi	‡J. F. Sechler		Vincennes, Ind.
Ohio & Mississippi		J. P. Coulter	Aurora, Ind.
Cincinnati Division	John Thumser		Seymour, Ind.
St. Louis Division	J. B. Wilson		Vincennes, Ind.
Springfield Division	E. K. Sechler		Pana, Ill.

Railroad.	*Master-Mechanic.*	*Master Car-Builder.*	*Residence.*
Old Colony	J. K. Taylor	A. Gleason	Boston, Mass.
B. C. F. & N. Bedford Div	Geo. W. Reynolds	Sam. E. Stevens	Taunton, Mass.
Ontario Southern	Geo. Thompson	Wm. Currier	Sodus Point, N. Y.
Oregon & California	§§J. Brandt		Portland, Oregon.
Oregon Steam Navigation Co	J. F. Curtis		Dalles, Oregon.
P			
Paducah & Elizabethtown	W. D. Robb	W. D. Robb	Elizabethtown, Ky.
Painesville & Youngstown	G. R. Crane		Painesville, O.
Panama	Thos. S. O'Brien		Aspinwall, U. S. C.
Parker & Karns City	Philip Davies	Wm. Wolford	Parker City, Pa.
Pensacola	R. G. Nichol		Pensacola, Fla.
Pensacola & Selma	R. H. Kelly		Selma, Ala.
Pennsylvania	§§T. N. Ely		Altoona, Pa.
Pennsylvania	H. D. Garrett	I. W. Van Houten	W. Philadelphia, Pa.
Pennsylvania	E. L. Caum	Samuel W. Myers	Harrisburg, Pa.
Pennsylvania	G. W. Stratton	John P. Levan	Altoona, Pa.
Pennsylvania	D. O. Shaver	J. G. Stewart	Pittsburg, Pa.
New Jersey Division	L. A. Bosdevex	E. F. Bosdevex	Meadow Shops, N. J.
New Jersey Division		David H. Baker	Jersey City, N. J.
West Penn. Division	C. B. Street	M. H. Falls	Blairsville, Pa.
Peoria, Decatur & Evansville	E. Clemens		Pekin, Ill.
Peoria, Pekin & Jacksonville	R. F. Hurd	R. F. Hurd	Pekin, Ill.
Peoria & Springfield	E. Deizerdt	E. Deizerdt	Peoria, Ill.
Petersburg	R. B. Andrews	J. W. Fleming	Petersburg, Va.
Philadelphia, Wilmington & Balt	S. A. Hodgman	Wm. Lungren	Wilmington, Del.
Philadelphia & Atlantic City			
Philadelphia & Erie	§§Howard Fly		Williamsport, Pa.
	W. F. Beardsley		Sunbury, Pa.
	W. L. Forster		Renva, Pa.
	W. L. Holman		Kane, Pa.
	W. T. Smith		Erie, Pa.
Philadelphia & Baltimore Central	S. D. Danfield	S. D. Danfield	Chester, Pa.
Philadelphia & Reading	*L. B. Paxon	John H. Rankin	Reading, Pa.
Germantown & Norris'n Div	Jackson Richards		Philadelphia, Pa.
Piedmont Air Line	‡R. D. Wade		Richmond, Va.
Rich. & Danville Div		J. B. Vaughan	Richmond, Va.
North Carolina Div		J. C. Hoit	Comp. Shops, N. C.
Pittsburgh, Cincinnati & St. Louis	§§G. W. Rhodes		Columbus, O.
Pittsburgh, Cincinnati & St. Louis	S. H. Winsor		Indianapolis, Ind.
Ind. & Vincennes Division	E. W. McKenna		Indianapolis, Ind.
Pittsburg & Columbus Div		A. K. Mansfield	Steubenville, O.
Little Miami Division	J. H. Setchel	John McVay	Cincinnati, O.
Little Miami Division		M. P. Ford	Columbus, O.
Col., Cin. & Ind. Division	Robert Curtis	Theo. Chamberlin	Columbus, O.
Col., Cin. & Ind. Div	Geo. H. Prescott	Geo. H. Prescott	Logansport, Ind.
Pittsburgh, Fort Wayne & Chicago	Geo. Parkin	John Marquis	Allegheny, Pa.
Pittsburgh, Fort Wayne & Chicago	J. M. Boon	Israel Lee	Fort Wayne, Ind.
Pittsburgh, Fort Wayne & Chicago		J. J. Kirkland	Crestline, O.
Pittsburgh, Titusville & Buffalo	H. J. Bookhammer	John Monks	Oil City, Pa.
Pittsburgh, Virginia & Charleston	Wm. Liniger		Pittsburg, Pa.
Pittsburgh & Lake Erie	S. W. Haines		Pittsburg, Pa.
Portland & Ogdensburg	Geo. E. Howe		St. Johnsbury, Vt.
Portland & Rochester	Edwin Thompson	David Dow	Portland, Me.
Port Dover & Lake Huron	H. M. Aldrich		Woodstock, Ont.
Port Royal & Augusta	Geo. Riley	J. H. Milton	Port Royal, S. C.
Poughkeepsie, Hartford & Boston	John L. Driscoll		Poughkeepsie, N. Y.
Prince Edward Island	A. Stronach	D. M. Fraser	Charlottet'n, P. E. I.
Providence & Springfield	G. T. Richardson		Pascoag, R. I.
Providence & Worcester	Albert S. Griggs	A. S. Griggs	Providence, R. I.
Providence, Warren & Bristol	Rufus Smith	J. Brightman	Bristol, R. I.
Q			
Quebec, Mont., Ottawa & Occidental	†A. Davis		Montreal, Can.
Quincy, Missouri & Pacific			Kirksville, Me.
R			
Raleigh & Augusta Air-Line	**B. R. Harding		Raleigh, N. C.
Raleigh & Gaston	**B. R. Harding	B. R. Harding	Raleigh, N. C.
Rhinebeck & Connecticut	A. W. Quackenbush	John H. Decker	Rondout, N. Y.
Rich., Fredericksburg & Potomac	H. Khun	W. H. Trainham	Richmond, Va.
Richmond & Danville	See Piedmont Air-Line.		
Richmond & Petersburg	John O'Brien	H. L. Carter	Richmond, Va.
Rich., York River & Chesapeake	A. B. Armstrong	A. B. Armstrong	Richmond, Va.
Rio Grande	G. W. Rendall	M. Murkwood	Brownsville, Tex.
Rock Island & Peoria	Joseph Elder		Peoria, Ill.
Rome, Watertown & Ogdensburg	Wm. H. Harris	Wm. H. Harris	Rome, N. Y.
Lake Ontario Division	Wm. Harris		Oswego, N. Y.
Rome, Georgia	O. W. Harbin	O. W. Harbin	Rome, Ga.
S			
Saginaw Valley & St. Louis			St. Louis, Mich.
San Francisco & Northern Pacific	Ed. Reynolds	H. C. Whiting	Petaluma, Cal.
Savannah & Charleston	H. A. Ulmo	J. D. Murphy	Charleston, S. C.
Savannah, Florida & Western	§Charles Collins	P. N. Raynall	Savannah, Ga.
Savannah & Memphis	R. A. Bridges		Opelika, Ala.
Scioto Valley	John Story		Portsmouth, O.
Seaboard & Roanoke	§§M. M. Pendleton		Portsmouth, Va.
Selma, Rome & Dalton	B. J. Sitton	W. W. Pierce	Selma, Ala.
Selma, Marion & Memphis	J. M. Levis		Marion, Ala.
Sheboygan & Fond du Lac	John Hickey	John Hickey	Sheboygan, Wis.
Shenango & Allegheny	Edw. Richardson		Greenville, Pa.
Shepaug	C. M. Allen		Litchfield, Ct.
Sioux City & Pacific	C. H. Foster	C. H. Foster	MissouriVal., Iowa.
Sioux City & St. Paul	F. C. Butterfield	F. C. Butterfield	Shakopee, Minn.
Southern Pacific.			
Northern Division	J. T. Wilson	F. N. Bellisle	San Francisco, Ca.
Los Angeles & Yuma Div	Jas. Velsir	J. S. Young	Los Angeles, Cal.
Tulare Division	S. Johnson		Tulare, Cal.
Tulare Division		J. Follansbee	Mojave, Cal.
South Carolina	W. B. Smith	Geo. H. Gramling	Charleston, S. C.
Southern Central	Chas. G. Brown	H. Mooney	Auburn, N. Y.
Southern Minnesota	J. B. Henney	J. B. Henney	Hokah, Minn.
South Pacific Coast	Martin Carter		Newark, Cal.
Southwestern of Georgia	D. M. Gugel	James A. Knight	Macon, Ga.
Spartanburg, Union & Columbia	Wm. Platt	W. B. Brown	Spartanburg, S. C.
Spartanburg & Asheville	Wm. Platt	W. B. Brown	Spartanburg, S. C.
Springfield, Athol & Northeastern	W. E. Granger		Springfield, Mass.
Springfield, Jackson & Pomeroy	G. A. Haggerty		Springfield, O.
State Line & Sullivan	J. O. Blight		Towanda, Pa.
Stockton & Copperopolis	John M. Fulton		Stockton, Cal.
Stonington & Providence	J. H. Anderson	J. H. Anderson	Providence, R. I.
St. Croix & Penobscot	G. H. Corsen	E. J. Fuller	Milltown, Me.
St. Johns	Jas. M. Owens		St. Augustine, Fla.
St. Joseph & Denver City	E. Sleppy		St. Joseph, Mo.
St. Lawrence & Ottawa	Calvin Dame	Calvin Dame	Prescott, Canada.
St. Louis, Iron Mount. & Southern	O. A. Haynes	Oscar Dootlittle	Carondelet, Mo.
Arkansas Division	L. Finlay	L. Finlay	Little Rock, Ark.
St. Louis, Alton & Terre Haute	**Beriah Warren		St. Louis, Mo.
St. Louis, Salem & Little Rock	Thomas Everson	A. W. Grosvernor	Steelville, Mo.
St. Louis & San Francisco	M. Kearney		Springfield, Mo.
St. Louis & Southeastern	**L. B. Salisbury	W. H. H. Price	Mt. Vernon, Ill.
St. Louis, Kansas City & Northern	W. H. Selby	C. S. Buck	Moberley, Mo.
St. Louis, Keokuk & Northwestern			Keokuk, Iowa.
St. Louis, Rock Island & Chicago		Henry Whiting	Beardstown, Ill.
St. Louis, Rock Island & Chicago	§§Geo. Chalender		Aurora, Ill.
St. Paul & Duluth	W. McFarland	John Hill	St. Paul, Minn.
St. Paul, Minneapolis & Manitoba	J. C. Munro		St. Paul, Minn.
St. Paul & Sioux City	F. C. Butterfield	F. C. Butterfield	Shakopee, Minn.
Sussex	E. H. Osborn	R. L. Sutton	Newton, N. J.
Syracuse, Binghamton & N. Y.	James Buchanan	James Buchanan	Syracuse, N. Y.
Syracuse, Chenango & New York	Geo. W. West		Syracuse, N. Y.
T			
Tennessee & Pacific	William McKeand	William McKeand	Nashville, Tenn.
T. H. & Indianapolis (Vandalia Line)	§§C. R. Peddle	E. D. Carter	Terre Haute, Ind.
Indianapolis Div (Vandalia Line)	Clinton Idler		Indianapolis, Ind.
Vandalia Div (Vandalia Line)	Chas. Butler		Effingham, Ill.

Railroad.	*Master Mechanic.*	*Master Car Builder.*	*Residence.*
Terre Haute & Logansport	A. J. Prescott	H. L. Clark	Logansport, Ind.
Texas & New Orleans	E. A. Campell		Houston, Texas.
Texas & Pacific	H. J. Small	F. M. Alexander	Marshall, Texas.
Tioga & Elmira Side Line	Pere Bonny	D. H. Stratton	Blossburg, Pa.
Toledo, Delphos & Burlington	E. Williams		Delphos, O.
Toledo, Peoria & Warsaw	W. O. Hewitt	R. M. Hemphill	Peoria, Ill.
Toronto, Grey & Bruce	†David Preston		Toronto, Can.
Toronto & Nipissing	J. Haggus		Toronto, Can.
Troy & Boston	Z. B. Davis	R. V. Coon	Troy, N. Y.
U			
Union Pacific	§J. H. Congdon	‡‡Geo. E. Stevens	Omaha, Neb.
Eastern Division		A. M. Collett	Omaha, Neb.
Eastern Division		H. P. Makely	Grand Island, Neb.
Mountain Division	T. A. Davis	John E. Davis	Cheyenne, Wg. T.
Laramie Division		Floyd Heavaner	Laramie, Wg. T.
Western Division		R. V. Brinkley	Evanston, Wg. T.
Colorado Division	James S. Scott	E. G. Thomas	Golden, Col.
Union Railway & Transit Co	H. M. Smith		St. Louis, Mo.
Utah Central	W. B. Armstrong	Sam. S. Tucker	Salt Lake City.
Utica & Black River	John Bailey	David James	Utica, N. Y.
Utica, Ithaca & Elmira	Lon F. McAleer	F. W. Magargil	Bresport, N. Y.
V			
Vicksburg & Meridian	Jas. B. Browne		Vicksburg, Miss.
Vicksburg, Shreveport & Texas	C. H. Tull		Monroe, La.
Virginia & Truckee	Jas. Gowan	B. W. Lyon	Carson, Nev.
Wabash, St. Louis & Pacific	Wm. Wilson		Fort Wayne, Ind.
Wabash, St. Louis & Pacific	§John C. Wills		Lafayette, Ind.
Wabash, St. Louis & Pacific	§Jacob Johann	B. B. Rose	Springfield, Ill.
Wabash, St. Louis & Pacific		U. H. Kohler	Toledo, Ohio.
Wallkill Valley	A. W. Quackenbush	Jno. H. Decker	Rondout, N. Y.
Wash. City, Va. Mid. & G. South	Jas. E. Waddey	J. T. Nalls	Alexandria, Va.
Washington & Ohio	Edward Dunn	John Harrison	Alexandria, Va.
Welland	James Taylor	Wm. H. Pay	St. Catharine, C.W.
Westchester & Philadelphia	John Moyer	Nathan Pawling	Philadelphia, Pa.
Western & Atlantic	John H. Flynn	W. G. Grambling	Atlanta, Ga.
Western Maryland	§David Holtz	J. H. Nussear	Union Bridge, Md.
Western North Carolina	Geo. W. Gates		Salisbury, N. C.
Western, of Alabama	Robert King	F. M. Wade	Montgomery, Ala.
Western R. R. N. C.	Isaac W. Clark	Isaac W. Clark	Fayetteville, N. C.
Western Union	John Taylor	E. A. Eddy	Racine, Wis.
West Feliciana	J. A. Tilton	Wm. McKelvey	Woodville, Miss.
West Jersey	W. McAllister	C. C. Williams	Camden, N. J.
White Water	§L. W. Wingert		Harrison, O.
Wilmington, Columbia & Augusta	John Bisset	W. H. Day	Florence, S. C.
Wilmington & Weldon	John Bisset	C. R. Clowe	Wilmington, N. C.
Wisconsin Central	G. Campbell	J. L. Adams	Stevens' Pt, Wis.
Worcester & Nashua	John G. Brady	John G. Brady	Worcester, Mass.

Directory of Railway Superintendents and Purchasing Agents

THROUGHOUT THE UNITED STATES AND CANADA.

REFERENCES.—* General Manager. † Managing Director. ‡ Assistant General Superintendent. § Assistant Superintendent. ** Superintendent of Transportation. §§ Assistant General Manager.

A

Railroad.	*Superintendent.*	*Purchasing Agent.*	*Residence.*
Adirondack	C. E. Durkee		Saratoga, N. Y.
Alabama Central	John M. Bridges		Selma, Ala.
Alabama Great Southern	Chas. P. Ball	Chas. P. Ball	Chattanooga, Tenn.
Albany & Susquehanna	*C. F. Young		Honesdale, Pa.
Alleghany Valley	David McCargo	John L. Awl	Pittsburgh, Pa.
Anderson, Lebanon & St. Louis	Jas. A. Larnerd		Anderson, Ind.
Arkansas Midland	*A. H. Johnson		Helena, Ark.
Ashtabula & Pittsburgh	D. B. McCoy		Ashtabula, O.
Atchison, Topeka & Santa Fe	*W. B. Strong	F. M. Smith	Topeka, Kan.
Western Division	Geo. B. Lake		Nickerson, Kan.
Eastern Division	D. J. Chase		Topeka, Kan.
Atchison & Nebraska	L. W. Towne		Atchison, Kan.
Atchison & Nebraska	*G. H. Nettleton	G. W. P. Atkinson	Kansas City, Mo.
Atlanta & Charlotte Air Line	*G. J. Foreacre		Atlanta, Ga.
Atlanta & West Point	L. P. Grant		Atlanta, Ga.
Atlantic & North Carolina	Jno. Hughes, Pres.		Newbern, N. C.
Atlantic & Great Western	P. D. Cooper		Cleveland, O.
Atlantic & Great Western		J. H. Holway	Meadville, Pa.
First Division	A. L. Dunbar		Meadville, Pa.
Second Division	A. L. Dunbar		Meadville, Pa.
Third and Fourth Divisions	T. A. Phillips		Galion, O.
Mahoning Division	J. M. Ferris		Cleveland, O.
Atlantic, Mississippi & Ohio		J. P. Minetree	Petersburg, Va.
Atlantic, Tennessee & Ohio	J. J. Gormley		Charlotte, N. C.
B			
Baltimore & Ohio	**W. M. Clements	N. S. Hill	Baltimore, Md.
Ohio & Chicago Division	C. H. Hudson		Chicago, Ill.
Pittsburgh Division	E. K. Morrison		Connellsville, Pa.
Baltimore & Potomac	Geo. C. Wilkins	A. W. Sumner	Baltimore, Md.
Bangor & Piscataquis	Arthur Brown		Bangor, Me.
Bath & Hammondsport	Geo. A. Sanders	Allen Wood	Hammondsport, N. Y.
Bedford, Sp'gville, Owensb'g & Bd. E.	Hurlbut		Bedford, Ind.
Bellefonte & Snow Shoe	Daniel Rhoads		Bellefonte, Pa.
Bell's Gap	Robert G. Ford		Bellwood, Pa.
Bennington & Rutland	F. C. White		Rutland, Vt.
Blairstown	J. D. Vail		Blairstown, N. J.
Boston, Revere Beach & Lynn	E. W. Whorf	E. W. Whorf	Boston, Mass.
Boston & Albany	Wm. Bliss		Boston, Mass.
Boston & Albany	C. O. Russell		Springfield, Mass.
Boston & New York Air Line	Jos. H. Franklin		New Haven, Conn.
Boston & Providence	A. A. Folsom	A. A. Folsom	Boston, Mass.
Boston, Concord & Montreal		Lyon & Vose	Boston, Mass.
Boston, Hoosac Tunnel & Western	E. B. Burnham		Mechanicsv'le, N.Y.
Boston & Maine	J. T. Furber	M. E. Wood	Boston, Mass.
Boston & Lowell	A. A. Hobart	F. H. Nourse	Boston, Mass.
Boston, Barre & Gardner	H. M. Witter	H. M. Witter	Worcester, Mass.
Brooklyn, Flatbush & Coney Isl'd.	E. Litchfield		Brooklyn, N. Y.
Brunswick & Albany	C. L. Schlotter		Brunswick, Ga.
Burlington & Lamoille	D. C. Linsley		Burlington, Vt.
Burlington & Mo. River (in Neb.)	*A. E. Touzalin	Geo. B. Harris	Omaha, Neb.
Burlington, Cedar Rapids & Nor'n	C. J. Ives	Rob't Williams	Cedar Rapids, Ia.
Burlington & Northwestern	John F. Gerry		Burlington, Ia.
Burlington & Southwestern	J. W. Smith	J. W. Smith	Burlington, Ia.
Buffalo, Ch'tauqua Lake & P'sb'g	John L. Burman		Mayville, N. Y.
Buffalo & Southwestern	*John F. Moulton		Buffalo, N. Y.
Buffalo, New York & Philadelphia	Geo. S. Gatchell		Buffalo, N. Y.
C			
Cairo & St. Louis	*L. M. Johnson	L. M. Johnson	St. Louis, Mo.
Cairo & Vincennes	Roswell Miller	T. W. Fitch	Cairo, Ill.
California Pacific & Northern	§J. A. Fillmore		Sacramento, Cal.
Camden & Atlantic	F. A. Lister	F. A. Lister	Camden, N. J.
Canada Central	T. A. McKinnon		Brockville, Can.
Canada Southern	*Wm. P. Taylor	A. T. Howland	St. Thomas, Ont.
American Division	W. D. Woodford		Toledo, O.
Canada Division	E. P. Murray		St. Thomas, Ont.
Toledo Division			Toledo, O.
Carbondale & Shawneetown	R. J. Cavett		Carbondale, Ill.
Carolina Central	V. Q. Johnson	C. H. Roberts	Wilmington, N. C.
Catasauqua & Fogelsville	C. W. Chapman	C. W. Chapman	Catasauqua, Pa.
Cayuga Southern	W. Stevenson		Sayre, Pa.
Cayuga & Susquehanna	W. R. Humphreys		Ithaca, N. Y.
Cazenovia, Canasota & De Ruyter	John Nebbins		Cazenovia, N. Y.
Central Branch Union Pacific	W. F. Downs	J. F. Pomeroy	Atchison, Kan.
Central Pacific	*A. N. Towne		San Francisco, Cal.
Central Pacific	‡E. C. Fellows		San Francisco, Cal.
Central Pacific		J. R. Watson	Sacramento, Cal.
Western & Visalia Divisions	A. D. Wilder		Oakland, Cal.
Truckee Division	Frank Fee		Wadsworth, Nev.
Humboldt Division	G. W. Codlington		Carlin, Nev.
Salt Lake Division	A. G. Fell		Ogden, Utah.
Sacramento & Oregon Div	R. H. Pratt		Sacramento, Cal.
Central Vermont	J. W. Hubart		St. Albans, Vt.
Central Vermont	‡J. M. Foss		St. Albans, Vt.
Western Division	John Schrier		Ogdensburg, N. Y.
Central & Southern Division	Ambrose Arnold		St. Albans, Vt.
Rutland Division	J. Burdett		Rutland, Vt.
New London Northern	C. F. Spaulding		New London, Conn.
Central of Georgia	Wm. Rogers	Henry Yonge	Savannah, Ga.
Atlanta Division	W. G. Raoul		Macon, Ga.
Central of Iowa	D. N. Pickering		Marshalltown, Ia.
Central of Minnesota	W. C. Van Horne		Mankato, Minn.
Central of New Jersey	James Moore	B. W. Burnet	Elizabeth, N. J.
Champaign, Havana & Western	A. H. Wood		Urbana, Ill.
Charlotte, Columbia & Augusta	Theo. D. Kline		Columbia, S. C.
Chesapeake & Ohio	W. M. S. Dunn	J. A. Netherland	Richmond, Va.
Eastern & Middle Division	G. S. Netherland		Richmond, Va.
Western Division	J. E. Mallory		Huntington, W. Va.

Railroad.	*Superintendent.*	*Purchasing Agent.*	*Residence.*
Cheraw & Darlington	R. D. Townsend		Society Hill, S. C.
Cherokee	William McRae		Cartersville, Ga.
Cheshire	R. Stewart	H. H. Stone	Keene, N. H.
Chester & Lenoir	James Mason		Chester, S. C.
Chicago & Northwestern	*Marvin Hughitt	R. W. Hamer	Chicago, Ill.
Chicago & Northwestern	§Chas. C. Wheeler		Chicago, Ill.
Wisconsin & Mill. Division	E. J. Cuyler		Chicago, Ill.
Peninsula Division	W. B. Lindsay		Escanaba, Mich.
Madison Division	C. A. Swineford		Baraboo, Wis.
Galena Division	Chas. Murray		Chicago, Ill.
Des Moines & Iowa Division	J. S. Oliver		Clinton, Iowa.
Winona & St. Peter Division	S. Sanborn		Winona, Minn.
Chicago & Alton	J. C. McMullen	A. V. Hartwell	Chicago, Ill.
Chicago & Alton	§O. Vaughn		Bloomington, Ill.
Chicago Division	A. M. Richards		Chicago, Ill.
St. Louis Division	H. W. Stager		Alton, Ill.
Jacksonville Division	T. M. Bates		Woodhouse, Ill.
Kansas City Division	J. H. Wood		Kansas City, Mo.
Chicago & Block Coal	*A. F. Beach		Veedersburg, Ind.
Chicago, Burlington & Quincy	*Thos. J. Potter	Wm. Irving	Chicago, Ill.
Chicago, Burlington & Quincy	John D. Basler		Galesburg, Ill.
Chicago Division	George Alexander		Chicago, Ill.
Middle, Galesb'g & Q'y Div	H. Hitchcock		Galesburg, Ill.
South Division	W. R. Crumpton		Rock Island, Ill.
Chi., Clinton, Dubuque & Minn	*F. O. Wyatt	F. O. Wyatt	Dubuque, Iowa.
Chicago & Eastern Illinois	O. S. Lyford		Chicago, Ill.
Chicago & Iowa	W. H. Holcomb, Rec		Rochelle, Ill.
Chicago & Northeastern	J. M. Turner		Lansing, Mich.
Chicago & Pacific	*J. M. Whitman	James Penny	Chicago, Ill.
Chicago & Paducah	D. H. Cocklin		Streator, Ill.
Chicago & Paducah		C. L. Rising	Chicago, Ill.
Chicago, St. Louis & New Orleans	*J. C. Clarke	J. C. Febger, Jr	New Orleans, La.
South Division	W. P. McKinley		McComb City, Miss.
North Division	J. G. Mann		Jackson, Tenn.
Chicago, Rock Island & Pacific	A. Kimball		Davenport, Iowa.
Chicago, Rock Island & Pacific	‡A. Manvel	A. Manvel	Chicago, Ill.
Southwestern Division	G. F. Walker		Trenton, Mo.
Iowa Division	H. F. Royce		Des Moines, Iowa.
Keokuk & Des Moines Div	Frank K. Hain		Keokuk, Ia.
Chicago & Michigan Lake Shore	*Geo. C. Kimball	H. Park	Muskegon, Mich.
Chicago & Michigan Lake Shore	§C. M. Lawler		St. Joseph, Mich.
Chicago, Milwaukee & St. Paul	*S. S. Merrill	J. T. Crocker	Milwaukee, Wis.
Western Union Division	D. A. Olin		Racine, Wis.
Chicago, Pekin & Southwestern	Malcolm Smith		Streator, Ill.
Chicago, Pekin & Southwestern		B. T. Lewis	Chicago, Ill.
Chicago, St. Paul & Minneapolis	E. W. Winter		Hudson, Wis.
Chicago & West Michigan	*Geo. C. Kimball		Muskegon, Mich.
Chippewa Falls & Western	L. C. Stanley		Chip'wa F'lls, Wis.
Cincinnati & Eastern	George H. Wilber		Batavia, O.
Cincinnati, Wabash & Michigan	*Norman Beckley	Norman Beckley	Elkhart, Ind.
Cincinnati, Richmond & Chicago	Lewis Williams		Cincinnati, O.
Cincinnati, Rock'l & Southwest'n	C. Branham		Rockport, Ind.
Cincinnati & Terre Haute	John Holland		Terre Haute, Ind.
Cin., Cumber'd Gap & Charleston	W. J. Taylor		Knoxville, Tenn.
Cincinnati, Hamilton & Dayton	Lewis Williams	P. Hickey	Cincinnati, O.
Cin., Hamilton & Indianapolis	Lewis Williams		Cincinnati, O.
Cincinnati, Lafayette & Chicago	J. W. Sherwood		Cincinnati, Ohio.
Cin., Sandusky & Cleveland	*D. W. C. Brown		Sandusky, O.
Cin., Sandusky & Cleveland			Sandusky, O.
Cincinnati Southern	Sam'l Woodward	C. M. Woodward	Cincinnati, O.
Cleve., Cin. & Indianapolis	*E. B. Thomas		Cleveland, O.
Indianapolis Division	C. C. Gale		Indianapolis, Ind.
Col. and Cincinnati Divs	Robert Blee		Cleveland, O.
Cleveland & Marietta	John Thomas		Cleveland, O.
Cleveland & Pittsburgh	*J. D. Layng	Wm. Mullins	Pittsburgh, Pa.
Cleveland, Mt. Vernon & Columb's	G. A. Jones		Mt. Vernon, O.
Cleve., Tuscarawas Val. & Wheel.	*Oscar Townsend		Cleveland, O.
Cobourg, Peterboro & Marmora	James R. Barber		Cobourg, Ont.
Columbus & Hocking Valley	Orland Smith		Columbus, O.
Columbus & Toledo	Orland Smith		Columbus, O.
Concord & Claremont	George E. Todd		Concord, N. H.
Concord	H. E. Chamberlin	H. E. Chamberlin	Concord, N. H.
Concord & Portsmouth	H. E. Chamberlin		Concord, N. H.
Connecticut Central	D. D. Warren, Pres.		Springfield, Mass.
Connecticut River	John Mulligan	John Mulligan	Springfield, Mass.
Connecticut Valley	Samuel Babcock		Hartford, Conn.
Connecticut Western	J. F. Jones		Hartford, Conn.
Connecticut & Passumpsic Rivers	H. E. Folsom		Lyndonville, Vt.
Corning, Cowanesque & Antrim	A. H. Gorton	R. J. Burnham	Corning, N. Y.
Covington & Black Hills	J. I. Booge		Sioux City, Iowa.
Cumberland Valley	J. F. Boyd	O. N. Lull	Chambersburg, Pa.
Cumberland & Pennsylvania	P. L. Burwell	P. L. Burwell	Cumberland, Md.
Cumberland & Maurice River	L. H. Dowdney		Port Norris, N. Y.
D			
Danbury & Norwalk	L. W. Sandiforth		South Norwalk, Ct.
Danville & Southwestern	James A. Eads		Paris, Ill.
Davenport & Northwestern	D. Flanigan		Davenport, Ill.
Dayton & Michigan	J. H. Weller		Dayton, O.
Dayton & Union	C. C. Gale		Indianapolis, Ind.
Dayton & Southeastern	J. E. Gimperling, Rec.		Dayton, O.
Delaware & Chesapeake	O. S. Sanford		Easton, Md.
Delaware & Hudson Canal Co.	B. Manville	E. M. King	Carbondale, Pa.
Delaware & Hudson Canal Co.	*C. F. Young		Honesdale, Pa.
Albany & Susq. Division	C. D. Hammond		Oneonta, N. Y.
Renssl'r & Saratoga Div	Theo. Voorhees		Troy, N. Y.
Delaware, Lackawanna & Western		G. W. B. Cushing	New York City.
Delaware, Lackawanna & Western	W. F. Hallstead		Scranton, Pa.
Bloomsburg Division	R. Bogart		Scranton, Pa.
Morris & Essex Division	Andrew Reasoner		Hoboken, N. J.
Oswego & Syracuse Division	W. R. Phelps		Oswego, N. Y.
Utica, Chenango & Sus. Div	W. G. Oakman		Scranton, Pa.
Delaware Western	David Connell		Wilmington, Del.
Denver & Rio Grande	S. R. Ainslie		Denver, Col.
Denver, South Park & Pacific	C. W. Fisher	Charles Wheeler	Denver, Col.
Des Moines & Ft. Dodge	C. N. Gilmore		Des Moines, Ill.
Detroit & Bay City	S. R. Callaway	Allan Bourn	Detroit, Mich.
Detroit, Gr. Haven & Milwaukee	W. J. Morgan	John S. Lorimer	Detroit, Mich.

Railroad.	*Superintendent.*	*Purchasing Agent.*	*Residence.*
Detroit, Hillsdale & Southwestern	W. T. Parker		Ypsilanti, Mich.
Detroit, Lansing & Northern	J. B. Mulliken	Allan Bourn	Detroit, Mich.
Dorchester & Delaware	J. M. Murphy		Cambridge, Md.
Dunkirk, Allegheny Val. & Pitts	D. Thayer		Dunkirk, N. Y.
Dunkirk, Allegheny Val. & Pitts		C. V. Deforest	New York City.
E			
East Broad Top	A. W. Sims		Orbisonia, Pa.
East Alabama & Cincinnati	W. W. Barnes		Opelika, Ala.
East Line & Red River	W. B. Ward		Jefferson, Tex.
East Tenn., Virginia & Georgia	**J. F. O'Brien		Knoxville, Tenn.
Eastern	D. W. Sanborn	Geo. J. Fisher	Boston, Mass.
Eastern Kentucky	H. W. Bates	Geo. Gibbs	Riverton, Ky.
Eastern Shore	W. Thompson		Prince Anne, Md
Erie & Pittsburgh	J. M. Kimball		Erie, Pa.
Erie & Pittsburgh	*J. D. Layng	Wm. Mullins	Pittsburg, Pa.
Eureka & Palisade	P. Evarts		Palisade, Nev.
European & North American	F. W. Cram		Bangor, Maine.
Evansville & Terra Haute	J. E. Martin	Jno. L. White	Evansvill, Ind.
Evansville, Terra Haute & Chi	Jos. Collett	W. D. Macferland	Terra Haute, Ind.
F			
Fitchburg	John Ackerman	F. S. Pratt	Boston, Mass.
Vermont & Mass. Div	E. K. Turner		Fitchburg, Mass.
Flint & Pere Marquette	Sanford Keeler	G. G. Cook	E Saginaw, Mich.
Florida Central	W. M. Davidson	W. M. Davidson	Jacksonville, Fla.
Flushing, North Shore & Central	Samuel Spencer	Samuel Spencer	L'g Isl'd C'y, N. Y.
Fonda, Johnstown & Gloversville	L. Caten		Gloversville, N. Y.
Fon du Lac, Amboy & Peoria	A. Kinyon		Fond du Lac, Wis.
Fort Wayne, Jackson & Saginaw	*P. B. Loomis	H. A. Raymond	Jackson, Mich.
Fort Wayne, Muncie & Cincinnati	W. W. Worthington	& P. Ag't.	Fort Wayne, Ind
Foxburg, St. Petersburg & Clarion	Benj. B. Newton		Foxburg, Pa.
Frankfort & Kokomo	E. Y. Comstock		Frankfort, Ind.
Fredericton	F. B. Edgecombe		Fredericton, N. B.
Freehold & New York	J. E. Ralph		Freehold, N. J.
G			
Galena & Wisconsin	A. J. Hellman	J. J. Gray	Galena, Ill.
Gal., Harrisburg & San Antonio	James Converse		Houston, Texas.
Gal., Houston & Henderson	*H. M. Hoxie	O. H. Dorrace	Palestine, Texas.
Geneva, Ithaca & Sayre	Wm. Stevenson		Sayre, Pa.
Georgia	S. K. Johnson	S. K. Johnson	Augusta, Ga.
Grand Haven	*F. H. May		Allegan, Mich.
G. Rapids, Newaygo & L. Shore	C. W. Garner		G. Rapids, Mich.
Grand Rapids & Indiana	W. O. Hughart, Pres't	W. R. Shelby	G. Rapids, Mich.
Northern Division	J. M. Matheany		G. Rapids, Mich.
Southern Division	P. S. O'Rielly		Fort Wayne, Ind.
Grand Trunk	*J. Hickson	John Taylor	Montreal, Canada.
Grand Trunk	W. J. Spicer		Montreal, Canada.
Grand Tower & Carbondale	T. M. Williamson	Wm. W. Harris	Grand Tower, Ill.
Grayville & Mattoon	H. L. Morrill, Rec.		Mattoon, Ill.
Great Western (Canada)	Charles Stiff		Hamilton, Ont.
Great Western (Canada)		G. R. Nash	London, Ont.
Green Bay & Minnesota	*Timothy Case		Green Bay, Wis.
Greenville & Columbia	Major R. H. Temple		Columbia, S. C.
Greenville, Col. & Birmingham	E. F. Bull		Greenville, Miss.
Greenwich & Johnsonville	H. H. Warner		Greenwich, N. Y.
Gulf, Colorado & Santa Fé	Geo. B. Nichols		Galveston, Texas.
Gulf, Western Texas & Pacific	M. D. Monserrate		Cuero, Texas.
H			
Hamilton & Northwestern	*F. W. Cumberland		Hamilton, Ont.
Hannibal & St. Joseph	*J. H. Carson	P. L. Dunn	Hannibal, Mo.
Hannibal & St. Joseph	W. H. Woodward		Hannibal, Mo.
Eastern Division			Hannibal, Mo.
Western Division	W. C. Alberger		Kansas City, Mo.
Hanover Junction & Gettysburg	Henry A. Young		Hanover, Pa.
Harlem Extension South	*R. C. Root		Bennington, Vt.
Havana, Rantoul & Eastern	H. E. Bullock	H. E. Bullock	Rantoul, Ill.
Housatonic	L. B. Stiffler	D. L. Draper	Bridgeport, Conn.
Houston, East & West Texas	J. E. Wiggin	J. E. Wiggin	Houston, Texas.
Houston & Texas Central	A. H. Swanson		Houston, Texas.
Southern Division	M. G. Brown		Houston, Texas
Northern Division	G. A. Quinlan		Corsicana, Texas.
Huntingdon & Broad Top	Geo. F. Gage	S. B. Knight	Huntington, Pa.
I			
Illinois Central	E. T. Jeffrey	O. Ott	Chicago, Ill.
Chicago Division	C. A. Beck		Centralia, Ill.
Northern Division	J. C. Nicholas		Amboy, Ill.
Iowa Division	D. W. Parker		Dubuque, Ill.
Springfield Division	T. J. Hudson		Springfield, Ill.
Illinois Midland	D. K. Hitch	L. Genis, Rec.	Paris, Ill.
Illinois & St. Louis	C. H. Sharman		St. Louis Mo.
Indiana, Bloomington & Western	I. D. Barton	H. C. Norton	Indianapolis, Ind.
Indianapolis, Cin. & Lafayette	*J. W. Sherwood	Geo. Tozzer	Indianapolis, Ind.
Indianapolis, Decatur & Spring	H. C. Moore		Tuscola, Ill.
Indianapolis & St. Louis	E. B. McClure	Fred. Ellison	Indianapolis, Ind.
Indianapolis, Peru & Chicago	E. C. Murphy		Indianapolis, Ind.
Indianapolis, Peru & Chicago		John Mc Kenna	Peru, Ind.
Intercolonial	D. Pottinger	L. B. Archibald	Moncton, N. B.
Halifax & St. John Division	Jas. Coleman		Moncton, N. B.
Northern Division	M. Busby		Rimouski, Can.
International & Great Northern	*H. M. Hoxie	H. M. Hoxie	Galveston, Texas.
Iowa Eastern	H. H. Kerr		Beulah, Iowa.
J			
Jacksonville, N. Western & S. E.	E. S. Greenleaf		Jacksonville, Ill.
Jacksonville, Pen. & Mobile	John P. Laird	John P. Laird	Tallahassee, Fla.
Jeff., Madison & Indianapolis	Jas. R. Shaler	Wm. Mullins	Pittsburg, Pa.
Jeff., Madison & Indianapolis	*D. W. Caldwell		Columbia, Ohio.
Junction & Breakwater	Tho. Groome		Lewes, Del.
K			
Kansas Central	W. A. Martin	W. A. Martin	Leavenworth, Kan.
Kansas City, Fort Scott & Gulf	Geo. A. Nettleton		Kansas City, Mo.
Kansas City, Fort Scott & Gulf	T. F. Oakes	G. W. P. Atkinson	Kansas City, Mo.
Kansas City, Lawrence & South	*G. H. Nettleton	G. W. P. Atkinson	Kansas City, Mo.
Kansas City, Lawrence & South	T. F. Oakes		Kansas City, Mo.
Kan. City, St. Joseph & C. Bluffs	J. F. Barnard		St. Joseph, Mo.
Kan. City, St. Joseph & C. Bluffs	*G. H. Nettleton	G. W. P. Atkinson	Kansas City, Mo.
Kansas City & Eastern	H. Hale		Independence, Mo.
Kansas Pacific	*S. H. H. Clark	A. D. Clark	Omaha, Neb.
Kansas Pacific	S. T. Smith		Kansas City, Mo.
Kaw Valley Division	J. O. Brinkerhoff		Kansas City, Mo.
Smoky Hill Division	J. T. Odell		Ellis, Kansas.
Denver Division	J. T. Odell		Denver, Col.
Cheyenne Divi'on	A. A. Egbert		Denver, Col.
Kent Co. & Smyrna & Del. Bay	J. F. Bingham		Chestertown, Md.
Kentucky Central	J. R. Ledyard		Covington, Ky.
Kingston & Pembroke	B. W. Folger	Wm. Harty	Kingston, Can.
Knox & Lincoln	C. A. Coombs	C. A. Coombs	Bath, Maine.
Knoxville & Ohio	G. J. Kinzel		Knoxville, Tenn.
L			
Lake Erie & Western	G. G. Hadley		Fremont, Ohio.
Lafayette, Bloom. & Muncie	D. S. Hill	E. St. Andress	Lafayette, Ind.
Lake Shore & Mich. Southern	*John Newell		Cleveland, Ohio.
Lake Shore & Mich. Southern	Charles Paine	A. C. Armstrong	Cleveland, Ohio.
Buffalo & Erie Division	C. B. Couch		Clevelahd, Ohio.
Toledo Division	Thos. Flesher, Jr.		Ceveland, Ohio.
Michigan Division	J. E. Curtis		Toledo, Ohio.
Detroit Division	P. S. Blodgett		Detroit, Mich.
Western Division	J. H. Parsons		Chicago, Ill.
Lansing Division	T. J. Charlesworth		Lansing, Mich.
Franklin Division	Geo. H. McIntire		Stoneboro, Pa.
Lehigh Valley	Robert H. Sayre		Bethlehem, Pa.
Lehigh Valley		L. Chamberlin	Philadelphia, Pa.
Beaver Meadow Division	A. G. Brodhead, Jr.		Mauch Chunk, Pa.
Mahanoy Division	James I. Blakslee		Mauch Chunk, Pa.
New Jersey Division	H. E. Packer		Metuchen, N. J.
Wyoming Division	A. Mitchell		Wilkesbarre, Pa.
Levis & Kennebec	W. C. Hall		Quebec, Can.

Railroad.	*Superintendent.*	*Purchasing Agent.*	*Residence.*
Ligonier Valley	Thos. A. Mellon		East Liberty, Pa.
Little Rock & Fort Smith	T. Hartman		Little Rock, Ark.
Little Rock, Miss. River & Texas	J. A. Woodson		Pine Bluff, Ark.
Los Angeles & Independence	W. J. L. Moulton		Los Angeles, Cal.
Long Island	J. R. Sharp, Rec.		L'g Isla'd C'y, N.Y.
Louisville & Nashville	*F. de Funiak		Louisville, Ky.
Louisville & Nashville	D. W. C. Rowland	G. C. Breed	Louisville, Ky.
Memphis Line	Jas. Montgomery		Bowling Green, Ky.
Nashville & Decatur Div	James Geddes		Nashville, Tenn.
So. & North Ala. Division	B. Dunham		Birmingham, Ala.
Louisville, Cincinnati & Lexington	Wm. Mahl	Wm. Mahl	Louisville, Ky.
Louisville, New Albany & Chicago		Wm. M. Lewis	New Albany, Ind.
Louisville, N. Albany & St. Louis	E. Newland, Pres		New Albany, Ind.
Lowell & Nashua	W. M. Parker		Boston, Mass.
M			
Macon & Brunswick	Geo. W. Adams	W. C. Jones	Macon, Ga.
Maine Central	Payson Tucker		Portland, Me.
Manchester & Keene	Charles E. Page		Nashua, N. H.
Manchester & Lawrence	H. E. Chamberlin		Concord, N. H.
Manchester & North Weare	H. E. Chamberlin		Concord, N. H.
Manhattan Elevated	*E. F. Winslow	M. K. King	New York, N. Y.
Eastern Division	Robert Stewart		New York, N. Y.
Western Division			New York, N. Y.
Marietta & Cincinnati	Jas. H. Stewart,	Harry McKee	Cincinnati, O.
Marietta, Pittsburg & Cleveland	S. C. Baldwin	R. B. Hoover	Marietta, O.
Marquette, Hought'n & Ontonag'n	*Samuel Schoch		Marquette, Mich.
McKean & Buffalo	S. Y. Golden		Sweetheart, Pa.
Memphis & Little Rock	*Rudolph Fink		Memphis, Tenn.
Memphis & Little Rock	W. E. Smith		Memphis, Tenn.
Memphis & Charleston	John A. Grant		Huntsville, Ala.
Memphis, Paducah & Northern	*N. Monsarrat		Paducah, Ky.
Michigan Air Line	*M. S. Hadley		Romeo, Mich.
Michigan Central	*H. B. Ledyard	Allan Bourn	Detroit, Mich.
Michigan Central	*E. C. Brown		Jackson, Mich.
Mackinaw & Saginaw Div	W. A. Vaughan		Bay City, Mich.
Main Line & G. R. & Kal. Div's.	C. B. Bush		Jach'on, Mich.
Middleburg & Schoharie	P. S. Demforth		Middleburg, N. Y.
Middletown & Crawford	D. Thompson		Tho'pson, N'g, N.Y.
Midland Railway of Canada	H. G. Taylor		Port Hope, Ont.
Milwaukee, Lake Shore & West'n	H. G. H. Reed		Milwaukee, Wis.
Mineral Point	G. W. Cobb	G. W. Cobb	Mineral Point, Wis.
Mineral Range	*C. E. Holland		Hancock, Mich.
Minneapolis & St. Louis	*Chas. F. Hatch	Chas. F. Hatch	Minneapolis, Minn.
Minneapolis & St. Louis	E. W. Gaylord		Minneapolis, Minn.
Minnesota Midland	J. H. Lakey		Wabasha, Minn.
Mississippi & Tennessee	M. Burke	M. Burke	Memphis, Tenn.
Missouri, Iowa & Nebraska	Col. Henry Hill	J. FitzHenry	Alexandria, Mo.
Missouri, Kansas & Texas	*Abram Mitchell	G. M. Babcock	Sedalia, Mo.
Sedalia, Ft. S. & Neosho Div.	L. Pearson		Sedalia, Mo.
Cherokee & Choctaw Div	E. Harding		Denison, Tex.
Missouri Division	Geo. H. Huntington		Hannibal, Mo.
Fort Scott Division	L. Pearson		Sedalia, Mo.
Missouri Pacific	A. A. Talmage	Oliver Garrison	St. Louis, Mo.
Eastern Division	Miller Bullard		St. Louis, Mo.
Mobile & Alabama Grand Trunk	F. B. Clark, Trest		Mobile, Ala.
Mobile & Ohio	*A. L. Rives		Mobile, Ala.
Northern Division	E. S. Hosford		Jackson, Tenn.
Southern Division	C. Fleming		Mobile, Ala.
Mobile & Girard	W. L. Clark		Columbus, Ga.
Mobile & Montgomery	Edmund L. Tyler	Daniel Tyler	Montgomery, Ala.
Mont Alto	G. B. Weidling		Mont Alto, Pa.
Montgomery & Eufaula	W. G. Raoul		Macon, Ga.
Montpelier & Wells River	W. A. Stowell		Montpelier, Vt.
Montrose	J. I. Blakslee		Montrose, Pa.
Morgan's Louisiana & Texas	Geo. Pandeley	C. A. Whitney & Co.	New Orleans, La.
Muncy Creek	H. R. Mehrling		Hughesville, Pa.
N			
Nashua, Acton & Boston	H. E. Chamberlin		Concord, N. H
Nashua & Lowell	Chas. E. Page	Chas. E. Page	Nashua, N. H.
Nashville, Chattanooga & St. Louis	J. W. Thomas		Nashville, Tenn.
Natchez, Jackson & Columbus	J. H. Fitzpatrick		Natchez, Miss.
Naugatuck	G. W. Beach		Waterbury, Conn.
Nebraska	Wm. Irving		Omaha, Neb.
Newburg, Dutchess & Connecticut	L. Kimball	C. L. Kimball	Dutchess Jct., N.Y.
New Brunswick & Canada	John Stewart		St. Stephen, N. B.
New Brunswick	Tho. Hoben		Gibson, N. B.
New Brunswick		W. R. Logan	Fredericton, N. B.
New Canaan	Wm. St. John		New Canaan, Conn.
New Castle & Franklin	A. Vandivort		New Castle, Pa.
New Haven & Derby	E. S. Quintard		New Haven, Conn.
New Haven & Northampton	C. N. Yeamans	C. N. Yeamans	New Haven, Conn.
New Jersey & New York	J. D. Hasbrouck		Jersey City, N. J.
New Jersey Midland	W. E. Lewis		Jersey City, N. J.
New Jersey Southern	W. S. Sneden		Long Branch, N. J.
New Orleans & Selma	T. H. Du Puy		Selma, Ala.
New Orleans & Pacific	D. B. Robinson	John J. Howell	New Orleans, La.
New York, Lake Erie & Western	*Robert Harris		New York, N. Y.
New York, Lake Erie & Western	E. S. Bowen	J. A. Hardenbergh	New York, N. Y.
New York, Lake Erie & Western	O. Chanute		New York, N. Y.
New York, Lake Erie & Western	**P. P. Wright		Jersey City, N. J.
Eastern Division	E. O. Hill		Port Jervis, N. Y.
Delaware Division	Benj. Thomas		Port Jervis, N. Y.
Susquehanna Division	R. B. Cable		Elmira, N. Y.
Buffalo & Rochester Div	R. G. Taylor		Buffalo, N. Y.
Western Division	J. S. Beggs		Dunkirk, N. Y.
New York & Harlem	Chas. M. Bissell	R. C. Moore	New York, N. Y.
New York & Greenwood Lake	C. W. Douglas	C. W. Douglas	Jersey City, N. J.
New York, New Haven & Hartford	J. M. Reed	R. N. Dowd	New Haven, Conn.
N. Y. & N. H. Division	John T. Moody		New York, N. Y.
Hartford Division	C. S. Davidson		Hartford, Conn.
Shore Line Division	W. H. Stevenson		New Haven, Conn.
New York Central & Hudson Riv			
Hudson River & Harlem Div	J. M. Toucey	C. V. DeForest	New York, N. Y.
Eastern Division	Zenas C. Priest		Utica, N. Y.
Western Division	Geo. H. Burrows		Syracuse, N. Y.
New York Central Division	Jas. Tillinghast		Buffalo, N. Y.
New York & Manhattan Beach	I. D. Barton		New York, N. Y.
New York & New England	*Jas. H. Wilson	W. W. McKim	Boston, Mass.
Eastern Division	H. M. Britton		Boston, Mass.
Norwich Division	P. St. M. Andrews		Boston, Mass.
Providence Division	L. W. Palmer		Providence, R. I.
Western Division	J. T. McManus		Hartford, Conn.
New York & Oswego Midland	*J. G. Stevens	T. C. Purdy	New York, N. Y.
Northern Division	C. W. Lanpher		Norwich, N. Y.
Southern Division	T. C. Purdy		Middletown, N. Y.
Northern Pacific	*H. E. Sargent	E. T. Williams	St. Paul, Minn.
Minnesota Division	H. A. Towne		Brainerd, Minn.
Pacific Division	J. W. Sprague		New Tacoma, W.T.
Northern of Canada	*F. W. Cumberland		Toronto, Can.
North Carolina	See Piedmont Air Line		
Northern Central	*Frank Thomson		Philadelphia, Pa.
Northern Central		A. W. Sumner	Baltimore, Md.
Baltimore Division	G. C. Wilkins		Baltimore, Md.
Elmira & Canandaigua Div	R. Neilson		Elmira, N. Y.
Susquehanna Division	W. A. Baldwin		Williamsport, Pa.
Northern (New Hampshire)	George E. Todd		Concord, N. H.
Northeastern (Georgia)	James M. Edwards		Athens, Ga.
Northeastern (South Carolina)	A. F. Ravenel		Charleston, S. C.
North Pacific Coast	*John W. Doherty	W. F. Russell	San Francisco, Cal.
Northwestern Ohio	J. S. Morris		Toledo, O.
Northwestern & Grand Trunk	Henry Funnell		Battle Creek, Mich.
Northwestern & Grand Trunk		J. H. Andrews	Port Huron, Mich.
O			
Ogdensburg & Lake Champlain	W. W. Hungerford		Ogdensburg, N. Y

Railroad.	Superintendent.	Purchasing Agent.	Residence.
Ohio & Mississippi	W. W. Peabody	G. E. Atwood	Cincinnati, O.
Eastern Division	C. B. Cole		Seymour, Ind.
Western Division	C. M. Stanton		St. Louis, Mo.
Louisville Division	C. Cole		Louisville, Ky.
Ohio & Toledo	N. A. Smith		Carrollton, O.
Old Colony	J. R. Kendrick	F. P. Moseley	Boston, Mass.
Northern Division	§S. A. Webber		Fitchburg, Mass.
Cape Cod Division	§C. H. Nye		Hyannis Mass.
Main Line Division	§J. H. French		Boston, Mass.
Olean, Bradford & Warren	J. W. Watson		Oleon, N. Y.
Omaha & Republican Valley	P. J. Nichols		Omaha, Neb.
Omaha & Northern Nebraska	J. E. House		Omana, Neb.
Ontario Southern	*James E. Briggs		Newark, N. Y.
Oregon & California	J. Brandt, Jr.	J. Brandt, Jr.	Portland, Oregon.
Oregon Steam Navigation Co	J. W. Sprague		Portland, Oregon.
Owensboro & Nashville	E. Culverhouse		Owensboro, Ky.

P

Paducah & Elizabethtown	Robert Meek		Elizabethtown, Ky.
Painesville & Youngstown	**J. A. Newcombe		Youngstown, O.
Panama	R. Morley		Aspinwall, N. G.
Parker & Karns City	W. C. Moberly		Parker City, Pa.
Peach Bottom	S. M. Manifold		Oxford, Pa.
Paw Paw & Toledo & South Haven	John Pulling		Lawton, Mich.
Pennsylvania	*Frank Thomson	Enoch Lewis	Philadelphia, Pa.
Pennsylvania	Charles E. Pugh		Altoona, Pa.
Pennsylvania	**John Reilly		Altoona, Pa.
New York Division	James McCrea		Jersey City, N. J.
Amboy Division	I. S. Buckelew		Camden, N. J.
Belvidere Division	J. A. Anderson		Lambertville, N. J.
New Jersey Division	F. Wolcott Jackson		Jersey City, N. J.
Philadelphia Division	W. F. Lockard		Philadelphia, Pa.
Middle Division	S. M. Prevost		Harrisburg, Pa.
Pittsburgh Division	Robert Pitcairn		Pittsburgh, Pa.
Tyrone Division	S. S. Blair		Tyrone, Pa.
Bedford Division	P. F. Smith		Harrisburg, Pa.
West Pennsylvania Division	E. B. Taylor		Allegheny City, Pa.
Lewistown Division	J. B. Hutchinson		Lewistown, Pa.
Pensacola	*W. D. Chipley		Pensacola, Fla.
Pensacola & Selma	*W. D. Chipley		Pensacola, Fla.
Peoria, Decatur & Evansville	G. R. Cobleigh	G. R. Cobleigh	Peoria, Ill.
Peoria, Pekin & Jacksonville	John Allen, Pres.	John Allen	Pekin, Ill.
Peoria & Springfield	J. R. Hilliard		Peoria, Ill.
Petersburg	R. Sully	L. E. Clark	Petersburg, Va.
Philadelphia & Atlantic City	Ellis Clark		Philadelphia, Pa.
Philadelphia & Reading	*J. E. Wootten	W. S. Wilson	Philadelphia, Pa.
Catawissa & Williamsport Br.	D. C. Reinhart		Philadelphia, Pa.
Reading & Columbia	Alex. M. Wilson		Columbia, Pa.
Lebanon & Fremont	H. W. Tracy		Pine Grove, Pa.
N. Penn. & B. Brook Divis'n.	A. H. Fracker		Philadelphia, Pa.
Philadelphia & Baltimore Central	Henry Wood	Henry Wood	Philadelphia, Pa.
Philadelphia & Erie	Wm. A. Baldwin		Williamsport, Pa.
Philadelphia & Erie		Enoch Lewis	Philadelphia, Pa.
Western Division	J. W. Reynolds		Erie, Pa.
Middle Division	E. B. Westfall		Renovo, Pa.
Eastern Division	Thomas Gucker		Williamsport, Pa.
Dany., Haz. & W. Barre Div.	Joseph Crawford		Sunbury, Pa.
Philadelphia, Wilmington & Balt.	H. F. Kenney		Philadelphia, Pa.
Philadelphia, Newt'n & New York	L. Bush		Philadelphia, Pa.
Piedmont Air-Line	T. M. R. Talcott	R. H. Duesbury	Richmond, Va.
Richmond & Danville Div.	W. A. Green		Richmond, Va.
North Carolina Division	A. B. Andrews		Comp. Shops, N. C.
Pine River Valley & Stevens Pt.	N. L. James		Richf'nd Cent., Wis.
Pittsburgh & Castle Shannon	A. G. Hays		Pittsburgh, Pa.
Pittsburgh & Lake Erie	R. P. Jones		Pittsburgh, Pa.
Pittsburgh, Cincinnati & St. Louis	S. M. Felton, Jr.	William Mullins	Pittsburgh, Pa.
Pittsburgh, Cincinnati & St. Louis	*D. W. Caldwell		Cumbus, O.
Pitts., Cin. & St. Louis Div.	J. H. Barrett		Pittsburgh, Pa.
Col., Cin. & Ind., Cent. Div.	J. Hill		Logansport, Ind.
Col., Cin. & Ind., Cent. Div.	J. F. Miller		Richmond, Ind.
Indianap. & Vincennes Div.	E. W. McKenna		Indianapolis, Ind.
Cincin. & Musk. Valley Div.	C. C. Waite		Zanesville, O.
Little Miami Div.	J. D. Ellison		Cincinnati, O.
Pittsburgh, Ft. Wayne & Chicago	*J. D. Layng	William Mullins	Pittsburgh, Pa.
Pittsburgh, Ft. Wayne & Chicago	C. E. Gorham		Chicago, Ill.
Eastern Division	George S. Griscom		Pittsburgh, Pa.
Western Division	C. D. Gorham		Fort Wayne, Ind.
Pittsburgh & Western	G. A. Woerth		Harmony, Pa.
Pittsburgh, Titusville & Buffalo	Tho. H. Wilson		Oil City, Pa.
Pittsburgh, Titusville & Buffalo		John L. Awl	Pittsburgh, Pa.
Pittsburgh, Virginia & Charleston	J. M. Byers		Pittsburgh, Pa.
Port Dover & Lake Huron	A. B. Atwater		Woodstock, Ont.
Port Royal & Augusta	R. G. Fleming		Port Royal, S. C.
Portland & Ogdensburg	J. Hilton	John E. Donnell	Portland, Me.
Vermont Division	A. B. Jewett		St. Johnsbury, Vt.
Portland & Rochester	J. M. Lunt	J. M. Lunt	Portland, Me.
Potomac, Fredericksb'h & Piedt	Charles Kennedy		Fredericksb'h, Va.
Poughkeepsie, Hartford & Boston	J. A. Perkins	J. W. Cable	Poughkeepsie, N. Y.
Prince Edward Island	Alex. McNabb		Charlotte'n, P. E. I.
Prospect Park & Coney Island	R. Schermerhorn		Coney Island, N. Y.
Providence & Springfield	William Tinkham	William Tinkham	Providence, R. I.
Providence & Worcester	W. E. Chamberlain		Providence, R. I.
Providence, Warren & Bristol	Waterman Stone		Providence, R. I.

Q

Quebec, Mont., Ott'a & Occidental	C. A. Scott		Montreal, Can.
Quebec Central	§A. Steele		Sherbrooke, Can.
Queen Anne & Kent County	†F. H. Irwin		Centreville, Md.
Quincy, Missouri & Pacific	F. D. Schermerhorn		Quincy, Ill.

R

Raleigh & Augusta Air-Line	J. C. Winder		Raleigh, N. C.
Raleigh & Gaston	J. C. Winder		Raleigh, N. C.
Rhinebeck & Connecticut	J. H. Jones		Rondout, N. Y.
Richmond, York Riv. & Chesap'ke	H. T. Douglas	Hugh Graham	Richmond, Va.
Richmond & Danville	(See Piedmont Air-Line).		
Richmond, Frederick'b'g & Potomac	T. D. Myers	T. L. Courtney	Richmond, Va.
Richmond & Petersburg			Richmond, Va.
Rio Grande	*M. J. Gomila		Brownsville, Tex.
Rochester & State Line	J. E. Childs		Rochester, N. Y.
Rockwood & Tennessee River	H. Clay Evans		Rockwood, Tenn.
Rock Island & Mercer County	*R. R. Cable		Rock Island, Ill.
Rock Island & Peoria			Rock Island, Ill.
Rome	Eben Hillyer		Rome, Ga.
Rome, Watertown & Ogdensburg	E. A. Van Horne		Watertown, N. Y.
Rome, Watertown & Ogdensburg		G. W. B. Cushing	New York City.
Rumford & Buckfield	S. T. Corser		Portland, Me.

S

Scioto Valley	*George D. Chapman		Columbus, O.
Scioto Valley	J. B. Peters		Columbus, O.
St. Croix & Penobscot	Wallace Haycock		Milltown, Me.
St. Lawrence & Ottawa	*Tho. Reynolds		Prescott, Can.
St. Johns	R. McLaughlin		St. Augustine, Fla.
St. Johns & Indian River	W. H. Churchill		Titusville, Fla.
St. John & Maine	H. D. McLeod		St. John, N. B.
St. Joseph & Western	L. D. Tuthill		St. Joseph, Mo.
St. Joseph & Western		A. D. Clarke	Omaha, Neb.
St. Louis, Alton & Terre Haute	Beriah Warren	Beriah Warren	St. Louis, Mo.
St. Louis, Hannibal & Keokuk	E. M. Greene		Hannibal, Mo.
St. Louis, Iron Mountain & South	Arthur W. Soper	W. S. Cuddy	St. Louis, Mo.
St. Louis & San Francisco	*C. W. Rogers		St. Louis, Mo.
Kansas Division	W. A. Thoms		Oswego, Kan.
St. Louis & Southeastern	O. M. Shepard	H. W. Gardiner	St. Louis, Mo.
St. Louis, Keokuk & Northwest'n	A. L. Griffin		Keokuk, Ia.
St. Louis, Salem & Little Rock	E. B. Sankey		Salem, Mo.
St. Louis, Salem & Little Rock		H. A. Crawford	St. Louis, Mo.

Railroad.	Superintendent.	Purchasing Agent.	Residence.
St. Paul & Duluth	Geo. H. Smith	C. F. Cruft	St. Paul, Minn.
St. Paul, Minneapolis & Manitoba	*Jas. J. Hill	J. C. Morrison	St. Paul, Minn.
St. Paul, Minneapolis & Manitoba	E. H. Wakeman		St. Paul, Minn.
St. Paul & Sioux City	J. F. Lincoln	J. F. Lincoln	St. Paul, Minn.
St. Paul, Stillwater & Taylor's Falls	A. B. Stickney		St. Paul, Minn.
Sacramento Valley & Placerville	Josiah Johnson		Sacramento, Cal.
Saginaw Valley & St. Louis	N. W. Merrill	N. W. Merrill	Saginaw, Mich.
San Francisco & North Pacific	A. A. Bean	P. E. Dougherty	Petaluma, Cal.
San Rafael & San Quentin	David Nye		San Rafael, Cal.
Savannah, Florida & Western	H. S. Haines	W. B. McKee	Savannah, Ga.
Savannah & Charleston	C. S. Gadsden		Charleston, S. C.
Savannah & Memphis	W. S. Greene		Opelika, Ala.
Seaboard & Roanoke	J. M. Robinson	J. A. Walton	Baltimore, Md.
Selma & Greensboro	E. W. Ruckar	E. W. Rucker	Marion, Ala.
Selma, Rome & Dalton	Norman Webb	Norman Webb	Selma, Ala.
Sheboygan & Fond du Lac	E. J. Cuyler		Fond du Lac, Wis.
Shenango & Allegheny	J. T. Blair		Greenville, Pa.
Shepaug	C. H. Platt		Litchfield, Conn.
Sioux City & Dakota	Geo. E. Merchant		Sioux City, Ia.
Sioux City & Pacific	F. C. Hills		Missouri Valley, Ia.
Sioux City & Pacific	*P. E. Hall	P. E. Hall	Cedar Rapids, Ia.
Skaneateles	J. McNamara		Skaneateles, N. Y.
South Carolina	John P. Peck	S. B. Pickens	Charleston, S. C.
Southeastern of Canada	M. A. Alden		Montreal, Can.
Southern Central	Jas. G. Knapp		Auburn, N. Y.
Southern Minnesota	J. M. Egan		La Crosse, Wis.
South Mountain	W. H. Woodward		Pine Grove Furnace, Pa.
Southern Pacific			
Northern Division	A. C. Bassett		San Francisco, Cal.
Los Angeles & Yuma Div	§E. E. Hewitt		Los Angeles, Cal.
Tulare Division	E. C. Fellows		Oakland, Cal.
South Pacific Coast	Thomas Carter		San Francisco, Cal.
Southwestern of Georgia	W. G. Raoul		Macon, Ga.
Southwestern of Kentucky	M. Tabler		Harrodsburg, Ky.
Spartanburg, Union & Columbia	Jas. Anderson	Jas. Anderson	Spartanburg, S. C.
Spartanburg & Asheville	Jas. Anderson	Jas Anderson	Spartanburg, S. C.
Springfield, Athol & Northeastern	Wm. W. Phelps		Springfield, Mass.
Springfield & Northwestern	*Geo. N. Black	J. A. Williams	Springfield, Ill.
Springfield, Jackson & Pomeroy	Wm. Thornburg, *Rec.*		Springfield, O.
Springfield & Western Missouri	F. P. Oakes		Kansas City, Mo.
Springhill & Parsboro	J. A. Killam		Parsboro, N. S.
State Line & Sullivan	J. O. Blight		Towanda, Pa.
Staten Island	John W. Wilber		Tottenville, N. Y.
Sterling Mountain	J. C. Missimer		Stoubury, N. Y.
Stonington & Providence	J. B. Gardiner		Providence, R. I.
Stonington & Providence		G. F. Ward	Stonington, Conn.
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Summit County	W. M. Riter		Coalville, Utah.
Sussex	E. C. Case	E. C. Case	Newtown, N. J.
Syracuse, Binghamton & N. Y.	W. K. Niver		Syracuse, N. Y.
Syracuse, Binghamton & N. Y.		G. W. Cushing	New York City.
Syracuse, Chenango & New York	A. C. Belden		Syracuse, N. Y.
Syracuse, Geneva & Corning	A. H. Gorton		Watkins, N. Y.

T

Tennessee & Pacific	J. W. Thomas		Nashville, Tenn.
Terre Haute & Ind'apolis / Van-	John E. Simpson		St. Louis, Mo.
Terre Haute & Ind'apolis / dalia	Joshua Staples		Indianapolis, Ind.
Terre Haute & Ind'apolis / Line.		C. R. Peddle	Terre Haute, Ind.
Terre Haute & Logansport	J. P. Claybrook, Rec.		Logansport, Ind.
Terre Haute & Southeastern	George Atherton		Terre Haute, Ind.
Texas & New Orleans	C. A. Burton	P. B. Watson	Houston, Tex.
Texas & Pacific	Geo. Noble	C. C. Comiskey	Marshall, Tex.
Jefferson Divis'n			Texarkana, Tex.
Trans-Continental Div.	J. S. Noble		Sherman, Tex.
Southern Division	C. Harris		Marshall, Tex.
Texas Western	J. W. Goodwin		Houston, Tex.
Tioga & Elmira State Line	L. H. Sbattuck		Blossburg, Pa.
Toledo, Delphos & Burlington	I. H. Burgoon		Delphos, O.
Toledo & Ann Arbor	J. S. Morris		Ann Arbor, Mich.
Toledo, Peoria & Warsaw	W. F. Merrill	W. F. Merrill	Peoria, Ill.
Troy & Boston	E. E. Aldrich		Troy, N. Y.
Toronto, Grey & Bruce	N. Weatherston	W. Watson	Toronto, Can.
Toronto & Nipissing	J. C. Bailey		Toronto, Can.
Tuckerton	J. J. Pharo	J. C. Ridgeway	Tuckerton, N. J.

U

Ulster & Delaware	Geo. Covkendall		Rondout, N. Y.
Union Pacific	*S. H. H. Clarke	A. D. Clarke	Omaha, Neb.
Union Pacific	§Jas. T. Clarke		Omaha, Neb.
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Mountain Division	Robert Law		Cheyenne, Wy. T.
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Union R. R. Trans. & S. Yard Co.	*M. A. Downing	**Albert Scott	Indianapolis, Ind.
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Utah Northern	Geo. W. Thatcher		Logan, Utah.
Utah Western	*W. W. Riter		Salt Lake City.
Utica & Black River	J. F. Maynard		Utica, N. Y.
Utica, Ithaca & Elmira	L. F. McAleer		Breesport, N. Y.

V

Vicksburg & Brunswick	W. G. Raoul		Macon, Ga.
Vermont Valley	John Mulligan		Springfield, Mass.
Vicksburg & Meridian	E. F. Ragsworth		Vicksburg, Miss.
Vicksburg, Shreveport & Texas	J. W. Green		Monroe, La.
Virginia & Truckee	H. M. Yerington	C. P. Mason	Carson, Nev.

W

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Illinois Division	C. H. Chappell		Springfield, Ill.
Ohio & Indiana Division	K. H. Wade		Fort Wayne, Ind.
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Waukon & Mississippi	F. O. Wyatt		Dubuque, Ia.
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Western & Atlantic	Wm. McRae	W. R. Webster	Atlanta, Ga.
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Windsor & Annapolis	*J. Innes		Kentville, N. S.
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Y

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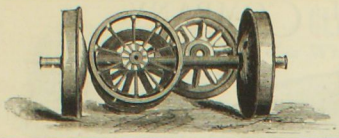

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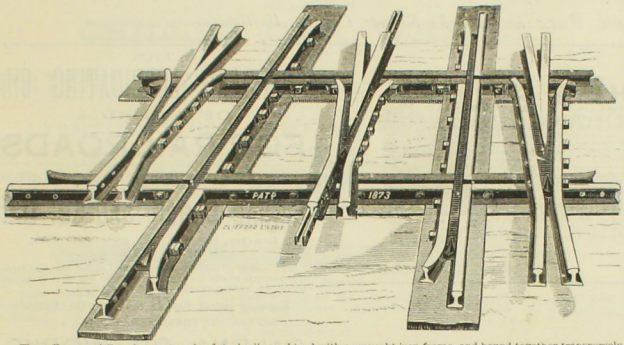

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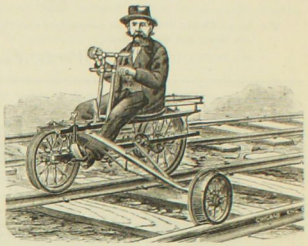

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Analysis shows a larger per centage of real Iron than any other Paint.

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GENTLEMEN—I have just completed an analysis of two samples of Iron Ore Paint from your Company, and find them to consist wholly of Iron Ore reduced to a fine powder. One of them is made of an Ore which contains very little but Sesqui-Oxide of Iron, and is somewhat calcareous. The following is the composition in parts in a hundred:

	RED PAINT.	PURPLE PAINT.
Sesqui-Oxide of Iron,	65.80	96.56
Insoluble Siliceous Residue,	21.90	3.39
Lime,	5.71	.00
Magnesia,	2.95	.00
Carbonic Acid, Sulphur, Phosphorus, &c.,	3.64	0.05
	100.00	100.00
Metallic Iron,	46.06 per cent.	67.59 per cent.

Analysis by Prof. E. W. MORLEY, Western Reserve College, Hudson, O.

Very Truly Yours

(Signed) Edw. W. Morley.

Send for samples before buying any other.

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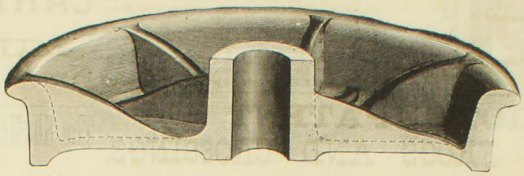
W. S. G. BAKER, President. J. M. LAWFORD, Secretary.



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Blowers	Daniels Planers	Hydraulic Presses	Portable Engines
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Cards	Gearing	Moulding Machines	Saw Mills
Chucks	Grist Mills	Nut Tappers	Saw Arbors
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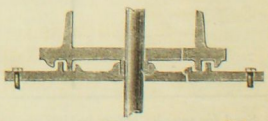

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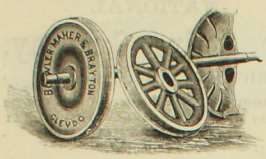

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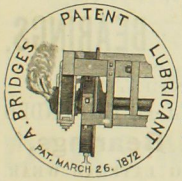

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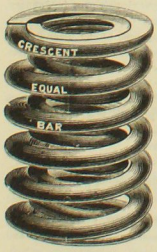

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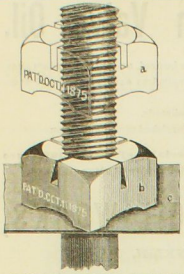

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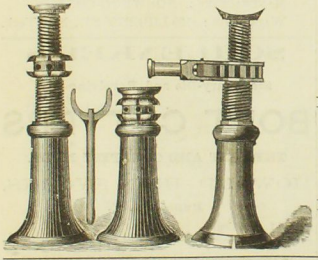

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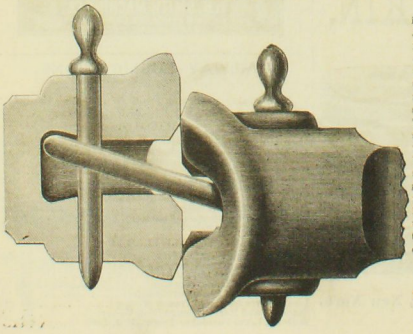

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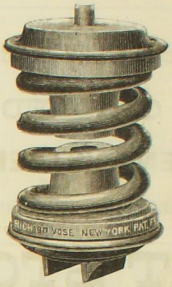

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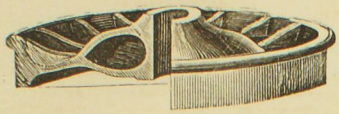

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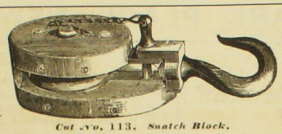

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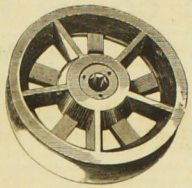

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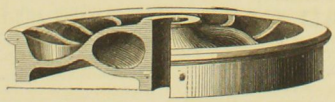

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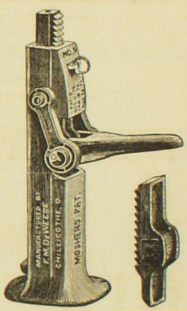

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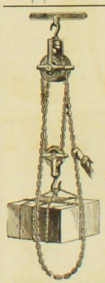

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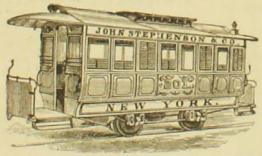

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